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SELECTIONS  
FROM  
THE WORKS OF LORD BACON.

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*Andrew J. Gress*  
*Trinity College Dublin*  
*June 1859*

SELECTIONS

FROM

THE WORKS OF LORD <sup>Francis</sup> BACON, <sub>11</sub> *use. 10. 4*

COMPRISING

THE PREFACES TO THE INSTAURATIO MAGNA AND NOVUM ORGANUM, THE DISTRIBUTIO OPERIS,

AND THE

FIFTH AND SEVENTH BOOKS DE AUGMENTIS SCIENTIARUM.

Translated, and illustrated with Notes

FROM THE

NOVUM ORGANUM, AND THE WRITINGS OF LOCKE, REID, STEWART, BROWN, WHATELY, MILL, Etc.

TOGETHER WITH AN

APPENDIX OF QUESTIONS.

BY

THOMAS W. MOFFETT, A. M.

SOMETIME SCHOLAR AND SENIOR MODERATOR OF TRINITY COLLEGE, DUBLIN.



DUBLIN

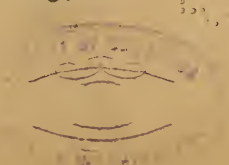
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## ADVERTISEMENT.

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IN preparing for publication the following Selections from Lord Bacon's writings, one of the principal objects kept in view was to exhibit a correct text, the editions in common use being very defective. No labour has been spared on this department, and it is hoped few errors have found their way into this impression.

With respect to the Translation, the method pursued has been to adhere with literal exactness to the words of the text. The difficulty of this can be duly appreciated only by those who make a similar attempt. A free translation would be an easier and more agreeable task, but would be useless for the purpose for which the book was designed, namely, the practical use of the student, and, at the same time, wholly unsuited to the singularly compressed and oracular style of the original.

In the Notes will be found incorporated almost every passage in the *Novum Organum* which serves to illustrate the text, together with the opinions of the most eminent philosophical writers on the same subjects since Bacon's time.

The Questions have been added, not for the purpose of superseding the student's industry, but to direct him as to the *sort* of questions he should be prepared to answer; many

of them have been proposed at the Fellowship Examination, which will account for the form in which they are put.

I had intended to add to this book the remaining portions of the *Novum Organum*, with Notes, &c., but the demands on my time have obliged me to relinquish this design for the present.

The imperfections which will, doubtless, be found in the book, may claim indulgence from a consideration of the difficulty of the task, and from the fact of my being only able to devote to its execution that portion of the day which remained after long and laborious mental employment.

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## INTRODUCTION.

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THAT the writings of Bacon have exercised a most important influence on the progress of science is universally admitted. No great thinker has ever appeared in the world, whose merits and services have been more fully recognised, or more highly extolled. He has been called, by common consent, the Father of the Inductive Philosophy. His method is constantly held up as the great discovery which has made other discoveries possible. He is regarded as having first opened and charted out the path which has since been trodden with so much glory by Newton, Davy, Franklin, and Watt. He is believed to have sown the seed,—then apparently insignificant,—which has since grown up into the stately tree of science, ever spreading forth new and luxuriant branches, and yielding to successive generations abundant and salutary fruit. He it was, we are told, who liberated the human intellect from a worse than Egyptian bondage, by breaking for ever the iron yoke of Aristotle, and

overthrowing the tyrannical dynasty of Syllogism. For two thousand years the "spell of the mighty enchanter of Stagyra" had sealed in slumber the intellectual vision of mankind; until the "strong conjuration" of this more potent magician awakened them again to life and activity. Men were the slaves of a debasing intellectual superstition, until this great Reformer dethroned the idols which occupied and defiled the sanctuary of Reason. Men were wandering like the Israelites in the wilderness, in endless weary circuits, "always moving, yet never advancing, reaping no harvest, and building no abiding city;" until

"Bacon, like Moses, led them forth at last"\*

into the goodly land of promise, flowing with milk and honey.

Now for all these representations there is a real foundation in fact. For vagueness and want of precision they may, perhaps, justly be censured; but their substantial truth can scarcely be contested. Bacon's philosophic achievements it is, indeed, almost impossible to exaggerate. He conceived and effected a vast intellectual revolution. He gave a new character and spirit to scientific inquiry. He impressed on the human mind a direction which it has since retained, and shall retain for ages. He explained with unrivalled force of thought and dignity of expression, the true aims and uses of

\* Cowley.

science. Drawing men away from the pursuit of chimerical El Dorados, he pointed out a real mine of inexhaustible wealth lying before them, ready to render up its treasures to their hands, and shewed them how to work it.

It is an obscure feeling of the truth of these general statements that has given Bacon such a high place in popular estimation. But among those who are perpetually repeating the phrases, "Baconian Philosophy," "Inductive Method," and the like, there are very few who take the trouble of analyzing their notions on the subject, and seeking for a direct and explicit answer to the question, What was it that Bacon actually did for science? What is the real amount and value of the work, *destructive* and *constructive*, which he effected?

Not only is this indistinctness of view with respect to Bacon's philosophic influence almost universal, but positively erroneous conceptions of it are very prevalent. Thus, some persons seem to think that Bacon's great merit lies in this, that he invented a way of arriving at truth called Induction, which had never been thought of before his time. But to *that* he certainly has no more claim than Aristotle has to the invention of the Syllogism; or "Linnæus to the *creation* of plants and animals; or Harvey to the praise of having *made the blood circulate*; or Lavosier, to that of having *formed the atmosphere* we breathe." Induction being the only mental process by which we can pass from the known to the unknown,

must have been practised from the beginning of time by every human being, and even by all reasoning animals. "It is constantly practised by the most ignorant clown, by the most thoughtless schoolboy, by the very child at the breast. It leads the clown to the conclusion, that if he sows barley he shall not reap wheat. By it the schoolboy learns that a cloudy day is the best for catching trout. The very infant, we imagine, is led by induction to expect milk from his mother or nurse, and none from his father.

"Not only is it not true that Bacon invented the inductive method, but it is not true that he was the first person who correctly analyzed that method and explained its uses. Aristotle had long before pointed out the absurdity of supposing that syllogistic reasoning could ever conduct men to the discovery of any new principle, had shown that such discoveries must be made by induction, and by induction alone; and had given the history of the inductive process, concisely indeed, but with great perspicuity and precision."

Again, it is a fundamental error to suppose, as many persons seem to do, that Bacon exploded the syllogistic method which had been previously in vogue. The syllogism, being the type of every ratiocinative process, when fully unfolded, cannot be exploded, but must always remain an indispensable logical instrument. By it we interpret, combine, and co-ordinate the results of induction. When Bacon speaks with scorn of the syllogism, he does not



mean to contest its correctness or value as an analysis and test of deductive reasonings; what he really objects to is the proceeding so common in his time, and not unfrequent even at the present time, of setting out from axioms obtained without due regard to the legitimate canons of induction; and setting up for laws of nature unverified consequences deduced from such axioms. "Syllogisms," says he, "consist of propositions, propositions of words, and words are the signs of notions; therefore, if our notions, the bases of all, are confused, and *over-hastily taken from things*, nothing that is built upon them can be firm; whence our only hope rests upon genuine induction."

By the elimination of these erroneous ideas, the acquisition of correct conceptions is greatly facilitated.

In order, then, to form a just appreciation of the philosophic importance of Bacon, we must view his writings in a two-fold aspect; first, with reference to the spirit which pervades them; and secondly, with reference to the specific rules of method which they contain. It is in the *spirit* of his works that their great originality lies. It is this which separates him from, and elevates him above all, thinkers who went before him, and justly confers on him the title of Father of Positive Philosophy. His scornful rejection of the contentious and unsubstantial systems of antiquity and

the schools,—his aversion to metaphysical subtleties,—his love of plain truth and practical utility,—his devoted fidelity to the solid interests of mankind,—in a word, his clear view and steady pursuit of the true objects and ends of scientific inquiry,—these are the characteristics to which, more than to aught else, he owes his high position among the benefactors of his species. “The chief peculiarity of Bacon’s philosophy,” says Mr. Macaulay, “seems to us to have been this, that it aimed at things altogether different from those which his predecessors had proposed to themselves. This was his own opinion. ‘*Finis scientiarum,*’ says he, ‘*a nemine adhuc bene positus est.*’ And again: ‘*Omnium gravissimus error in deviatione ab ultimo doctrinarum fine consistit.*’ ‘*Nec ipsa meta,*’ says he elsewhere, ‘*adhuc ulli, quod sciam, mortalium posita est et defixa.*’ The more carefully his works are examined, the more clearly, we think, it will appear that this is the real clue to his whole system, and that he used means different from other philosophers; because he wished to arrive at an end altogether different from their’s. What, then, was the end which Bacon proposed to himself? It was, to use his own emphatic expression, ‘fruit.’ It was the multiplying of human enjoyments, and the mitigating of human sufferings. It was ‘the relief of man’s estate.’ It was ‘*commodis humanis inservire.*’ It was ‘*efficaciter operari ad sublevanda vitæ*

humanæ incommoda.' It was 'dotare vitam humanam novis inventis et copiis.' It was 'genus humanum novis operibus et potestatibus continuo dotare.' "

This eminently practical and positive spirit he carried into all his speculations in every department of science. He is often, but erroneously, represented as having ascribed too exclusive importance to the physical sciences, to the neglect of ethical and political inquiries; but in the *Novum Organum* he explicitly declares, that his philosophy is no less a moral than a natural philosophy; and that the principles of his logic are just as applicable to researches concerning the nature of man and the laws of society, as to those investigations concerning the phenomena of the material world, from which the illustrations of his method are principally derived.

"He has left us many admirable practical observations on what he somewhat quaintly called the Georgics of the mind, or the mental culture which tends to produce good dispositions. Some persons, he said, might accuse him of spending labour on a matter so simple that his predecessors had passed it by with contempt. He desired such persons to remember that he had from the first announced the objects of his search to be not the splendid and the surprising, but the useful and the true, not the deluding dreams which go forth through the shining portal of ivory, but the humbler realities of the gate of horn.—(*De Augmentis*, lib. vii. cap. 3.)"

“ True to this principle, he indulged in no rants about the fitness of things, the all-sufficiency of virtue, and the dignity of human nature. He dealt not at all in resounding nothings, such as those with which Bolingbroke pretended to comfort himself in exile, and in which Cicero vainly sought consolation after the loss of Tullia. The casuistical subtleties which occupied the attention of the keenest spirits of his age, had, it should seem, no attractions for him. The doctors, whom Escobar afterwards compared to the four beasts and four-and-twenty elders in the Apocalypse, Bacon dismissed with the most contemptuous brevity: ‘Inanes plerumque evadunt et futiles.’—(*De Augmentis*, lib. vii. cap. 2.)” “Nor did he ever meddle with those enigmas which have puzzled hundreds of generations, and will puzzle hundreds more. He said nothing about the grounds of moral obligation, or the freedom of the human will. He had no inclination to employ himself in labours resembling those of the damned in the Grecian Tartarus, to spin for ever on the same wheel round the same pivot, to gape for ever after the same deluding clusters, to pour water for ever into the same bottomless buckets, to pace for ever to and fro on the same wearisome path after the same recoiling stone. He exhorted his disciples to prosecute studies of a very different description, to consider moral science as a practical science, a science of which the object was to cure the diseases and perturbations of the mind, and which could be

improved only by a method analogous to that which has improved medicine and surgery. Moral philosophers ought, he said, to set themselves vigorously to work, for the purpose of discerning what are the actual effects produced on the human character by particular modes of education, by the indulgence of particular habits, by the study of particular books, by society, by emulation, by imitation. Then we might hope to find out what mode of training was most likely to preserve and restore moral health.—(*De Augmentis*, lib. vii. cap. 3.)”\*

It is, perhaps, by contrasting the Baconian philosophy with the systems of the ancient schools, that this characteristic spirit to which we are inclined to attach so much importance, is brought most distinctly into view. Mr. Macaulay, in his brilliant Essay,† has developed this comparison with great eloquence and variety of illustration. “Two words form the key of the Baconian doctrine, Utility and Progress. The ancient philosophy disdained to be useful, and was content to be stationary. It dealt largely in theories of moral perfection, which were so sublime that they never could be more than theories; in attempts to solve insoluble enigmas; in exhortations to the attainment of unattainable frames of mind. It could not descend to the humble office of ministering to the comforts of human be-

\* Macaulay.

† Review of Montagu's Bacon; *Edinburgh Review*, July, 1837.

ings." "It is very reluctantly that Seneca can be brought to confess that any philosopher had ever paid the smallest attention to any thing that could possibly promote what vulgar people would consider as the well-being of mankind. He labours to clear Democritus from the disgraceful imputation of having made the first arch, and Anacharsis from the charge of having contrived the potter's wheel." " 'In my own time,' says he, 'there have been inventions of this sort, transparent windows, tubes for diffusing warmth equally over all parts of a building, shorthand which has been carried to such a perfection, that the writer can keep pace with the most rapid speaker. But the invention of such things is drudgery for the lowest slaves: philosophy lies deeper. It is not her office to teach men how to use their hands. The object of her lessons is to form the soul: *Non est, inquam, instrumentorum ad usus necessarios opifex.*' If the *non* were left out, this last sentence would be no bad description of the Baconian philosophy." "Its object was the good of mankind, in a sense in which the mass of mankind always have understood, and always will understand, the word good. 'Meditor,' said Bacon, 'instauracionem philosophiæ ejusmodi quæ nihil inanis aut abstracti habeat, quæque vitæ humanæ conditiones in melius provehat.' We may take Plato as the highest type of the ancient philosophy. His aim was 'to exalt man into a god.' Bacon's was 'to provide man with what he requires while

he continues to be man.' The aim of the Platonic philosophy was to raise us far above vulgar wants. The aim of the Baconian philosophy was to supply our vulgar wants. The former aim was noble, but the latter was attainable." "The philosophy of Plato began in words and ended in words; noble words indeed, words such as were to be expected from the first of human intellects, exercising boundless dominion over the finest of human languages. The philosophy of Bacon began in observations and ended in arts."

The *spirit* of Bacon, then, we believe to be the great heir-loom which he left to posterity. It has thoroughly incorporated itself with science. It is the living principle which insures its indefinite progress. It is *this spirit* which has made the wise and weighty aphorisms of Bacon perpetual texts and watch-words with philosophical writers. It is this which makes his writings, even at the present day, one of the most useful studies in which men of science can engage.

As a system of specific rules, Bacon's method is historically interesting, but its present intrinsic value is but small. Those who have studied the philosophy of the sciences as it is presented in the writings of recent thinkers, will not have much to learn from him. And this is altogether what was to be expected; for a theory of scientific methods cannot be constructed *a priori*. To understand the processes by which laws of nature are to be dis-

covered and proved, we must examine how those already established have actually been discovered and proved; and it is only on such an inquiry that a genuine *ars inventionis* can be founded. Now it must always be remembered, that Bacon had no established science for a model, and when this fact is well considered, our wonder will be, that with such poor materials he could do so much towards the construction of a theory of the Inductive Method.

The two special errors in Bacon's conception of that method have been pointed out and refuted by Mr. Mill. The first was the opinion he seems, strangely enough, to have entertained of the non-plurality of causes. "All his rules tacitly imply the assumption, so contrary to all we know of nature, that a phenomenon can have but one cause." The other error was the supposition, that there exists a law of uniformity of co-existences, analogous to the great primary law of successive phenomena, by means of which the principle of elimination could be applied in the same sense, and in the same universal and unqualified manner, to the investigation of co-existences as to that of causes.

If we regard not merely his analysis of the inductive process, but his general conception of scientific methods in the largest sense, we shall find him to have committed a still more serious error. "He enumerates as an universal rule, that induction should proceed from the lowest to the middle principles, and from



those to the highest, never reversing that order, and consequently leaving no room for the discovery of new principles by way of deduction at all. It is not to be conceived that a man of Bacon's sagacity could have fallen into this mistake, if there had existed in his time among the sciences which treat of successive phenomena, one single deductive science, such as mechanics, astronomy, optics, acoustics, &c., now are. In those sciences it is evident that the higher and middle principles are by no means derived from the lowest, but the reverse. In some of them the very highest generalizations were those earliest ascertained with any scientific exactness; as, for example (in mechanics), the laws of motion."

It is of peculiar importance to notice *this* oversight at the present day, when the functions of pure induction are almost exhausted, and the Baconian conception of Scientific Method has almost completed the work it was capable of effecting. We are now advanced into a further and higher stage, in which deduction becomes the grand instrument of research. Liebig has shewn how much this instrument is destined to do for the advancement and consolidation of chemistry; and the sciences which still remain to be developed, the most difficult and complicated of all, namely, Biology and Sociology, absolutely refuse to be treated by any other method.

Bacon expected the "ars inventionis" to grow and unfold itself "cum ipsis inventis." And that antici-

pation has been realized. Since his time there has been a period of unexampled scientific activity ; and eminent recent writers have instituted a philosophic revision of that period, and have thus been led to larger and truer views of the nature of induction and the theory of method in general. Sir John Herschel's Introduction to the Study of Natural Philosophy, and Dr. Whewell's History and Philosophy of the Inductive Sciences, contain many valuable contributions to our knowledge of these subjects. But no English author has done so much for the theory of scientific method as Mr. John Mill. Almost all preceding writers on Logic had conceived that science as consisting purely of the doctrine of the syllogism, and such discussions as are illustrative of and subsidiary to it, passing over induction with a very slight notice. Archbishop Whately, to whom we owe the best extant treatise on Logic in this restricted sense, devotes only a few pages to the consideration of Induction ; analyzing it into two parts, one an inquiry respecting matter-of-fact, and the other a Ratiocination ; the former of which he discards as not coming within the proper province of Logic. But Mr. Mill, regarding Logic as the theory of proof in the widest sense, and reducing ratiocination ultimately to induction, which, in his view, is the single primary type of all inference, institutes a regular and detailed analysis of the inductive process, and constructs, for the first time, a system of scientific canons for its correct performance.

Every one who wishes to have a profound and thorough acquaintance with the methods of modern science, ought carefully to study this valuable work.

Another treatise of extraordinary merit has appeared in our own times, not so directly connected with the inductive logic in particular, but in which the whole philosophy of science is viewed with a clearness of insight and an encyclopedic comprehensiveness, which mark the author as the Bacon of the nineteenth century. We allude to the "Philosophie Positive" of M. Comte. In this great work he has undertaken a twofold enterprise: first, to complete the whole body of science by adding to those departments of it already definitively constituted, and more or less developed, the new department of Sociology; and, secondly, to coordinate and combine into a separate study, under the name of "Positive Philosophy," the generalities of science,—its large results and leading methods. In working out this latter conception, he has given abundant expositions of the logic of induction. But he has studied the subject under a less abstract aspect, and in a less purely theoretical manner, than Mr. Mill. Instead of seeking to determine the universal canons of inductive inquiry, to ascertain the conditions which any fact or set of facts must satisfy in order to prove other facts, and thus to arrive at the soul and essence of all induction, considered simply as a logical process,—M. Comte rather examines the more concrete question

of the variety of forms which such inquiry should assume in order to adapt itself to the various kinds of laws which do actually present themselves to our investigations. It is, in fact, less to induction, as such, than to the "operations subsidiary to induction," that he directs his attention ; for it is among these latter that observation, experiment, classification, and the like, are to be placed.

The entire subject is far from being exhausted. When Bacon brought forward his great project of reform, he did not expect to effect it by his single strength nor even with the aid of his contemporaries. He did not "confide that such a thing could be brought to its perfect close in the space of one single age, but assigned it as a task to a succession of generations." He thought it natural that no less attention should be devoted to the construction and exposition of the inductive logic than had been spent on the deductive and syllogistic. In truth, there ought to be a perpetual *Instauratio Scientiarum*. As we advance in the path of research, we discern more clearly what lies before us, and what method must be followed in order to make further and more rapid progress. New classes of facts come to be investigated, for which the existing methods of inquiry are ineffective, unless suitably modified ; and thus our *Organon* is perpetually in the process of improvement, and may be expected to improve without limit.

## PRÆFATIO,

DE STATU SCIENTIARUM, QUOD NON SIT FELIX, AUT MAJOREM IN MODUM  
AUCTUS; QUODQUE ALIA OMNINO, QUAM PRIORIBUS COGNITA FUERIT,  
VIA APERIENDA SIT INTELLECTUI HUMANO; ET ALIA COMPARANDA  
AUXILIA, UT MENS SUO JURE IN RERUM NATURAM UTI POSSIT.

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VIDENTUR nobis homines, nec opes, nec vires<sup>1</sup> suas bene nosse; verum de illis majora quam par est, de his minora, credere. Ita fit, ut aut artes receptas insanis pretiis aestimantes, nil amplius quærant; aut seipsos plus æquo contemnentes, vires suas in levioribus consumant, in iis quæ ad summam rei faciant, non experiantur. Quare sunt et suæ scientiis columnæ<sup>2</sup>, tanquam fatales; cum ad ulterius penetrandum, homines nec desiderio nec spe excitentur. Atque, cum opinio copiæ inter maximas causas inopiæ sit; quumque ex fiduciâ præsentium, vera auxilia negligantur in posterum; ex usu est, et plane ex necessitate, ut ab illis, quæ adhuc inventa sunt, in ipso operis nostri limine (idque relictis ambagibus, et non dissimulanter) honoris et admirationis excessus tollatur; utili monito, ne homines eorum aut copiam, aut utilitatem, in majus accipiant, aut celebrent. Nam si quis in omnem illam librorum varietatem, quâ artes et scientiæ exultant, diligentius introspectat, ubique inveniet ejusdem rei repetitiones infinitas, tractandi modis diversas, inventione præoccupatas; ut omnia primo intuitu numerosa, facto examine, pauca reperiantur. Et de utilitate aperte dicendum est; sapientiam istam, quam a Græcis<sup>3</sup> po-

tissimum hausimus, pueritiam quandam scientiæ videri, atque habere quod proprium est puerorum; ut ad garriendum prompta, ad generandum invalida et immatura sit. Controversiarum enim ferax, operum<sup>4</sup> effœta est. Adeo ut fabula illa de Scyllâ, in literarum statum, qualis habetur, ad vivum quadrare videatur; quæ virginis os et vultum extulit, ad uterum vero monstra latrantia succingebantur et adhærebant. Ita habent et scientiæ, quibus in suevimus, generalia quædam blandientia et speciosa; sed cum ad particularia ventum sit, veluti ad partes generationis, ut fructum et opera ex se edant, tum contentiones et oblatrantes disputationes exoriuntur, in quas desinunt, et quæ partûs locum obtinent. Præterea, si hujusmodi scientiæ plane res mortua non essent, id minime videtur eventurum fuisse, quod per multa jam secula usu venit; ut illæ suis immotæ fere hæreant vestigiis, nec incrementa<sup>5</sup> genere humano digna sumant: eo usque, ut sæpenumero non solum assertio maneat assertio, sed etiam quæstio maneat quæstio, et per disputationes non solvatur, sed figatur et alatur; omnisque traditio et successio disciplinarum repræsentet et exhibeat personas magistri et auditoris, non inventoris et ejus qui inventis aliquid eximium adjiciat. In artibus autem mechanicis, contrarium evenire videmus: quæ, ac si auræ cujusdam vitalis forent participes, quotidie crescunt et perficiuntur; et in primis auctoribus rudes plerumque et fere onerosæ et informes apparent, postea vero novas virtutes et commoditatem quandam adipiscuntur, eo usque ut citius studia hominum et cupiditates deficient et mutantur, quam illæ ad culmen et perfectionem suam pervenerint. Philosophia contra et scientiæ intellectuales, statuarum more, adorantur et celebrantur, sed non promoventur: quin etiam in primo nonnunquam auctore maxime vigent, et deinceps degenerant. Nam postquam homines dedititii facti sint, et in unius sententiam (tanquam pedarii senatores) coierint, scientiis ipsis amplitudinem non addunt,

sed in certis auctoribus ornandis et stipandis servili officio funguntur. Neque illud afferat quispiam; Scientias, paulatim succrescentes, tandem ad statum quendam pervenisse, et tum demum (quasi confectis spatiis legitimis) in operibus paucorum sedes fixas posuisse; atque postquam nil melius inveniri potuerit, restare scilicet, ut quæ inventa sint exornentur et colantur. Atque optandum quidem esset, hæc ita se habuisse. Rectius illud et verius; istas scientiarum mancipationes nil aliud esse, quam rem ex paucorum hominum confidentiâ, et reliquorum socordiâ et inertiâ natam: postquam enim scientiæ per partes diligenter fortasse excultæ et tractatæ fuerint, tum forte exortus est aliquis, ingenio audax et propter methodi compendia acceptus et celebratus, qui specie tenus artem constituerit, revera veterum labores corruerit. Id tamen posteris gratum esse solet, propter usum operis expeditum, et inquisitionis novæ tædium et impatientiam. Quod<sup>6</sup> si quis consensu jam inveterato, tanquam temporis judicio, moveatur; sciat se ratione admodum fallaci et infirmâ niti. Neque enim nobis magnâ ex parte notum est, quid in scientiis et artibus, variis seculis et locis, innotuerit, et in publicum emanarit; multo minus, quid a singulis tentatum sit, et secreto agitatum. Itaque nec temporis partus nec abortus extant in fastis. Neque ipse consensus<sup>7</sup> ejusque diurnitas magni prorsus æstimandus est. Utcunque enim varia sint genera politiarum, unus est status scientiarum, isque semper fuit et mansurus est popularis. Atque apud populum plurimum vigent doctrinæ, aut contentiosæ et pugnaces, aut speciosæ et inanes; quales videlicet assensum aut illaqueant aut demulcent. Itaque maxima ingenia proculdubio per singulas ætates vim passa sunt; dum viri captu et intellectu non vulgares, nihilo secius existimationi suæ consulentes, temporis et multitudinis judicio se submiserint. Quamobrem altiores contemplationes, si forte usquam emicuerunt, opinionum vulgarium

ventis subinde agitatae sunt, et extinctae: adeo ut tempus, tanquam fluvius, levia et inflata ad nos devexerit, gravia et solida demerserit. Quin et illi ipsi auctores, qui dictaturam quandam in scientiis invaserunt, et tantâ confidentiâ de rebus pronuntiant; cum tamen per intervalla ad se redeunt, ad querimonias de subtilitate naturæ, veritatis recessibus, rerum obscuritate, causarum implicatione, ingenii humani infirmitate, se convertunt: in hoc nihilo tamen modestiores, cum malint communem hominum et rerum conditionem causari quam de seipsis confiteri. Quin illis hoc fere solenne est, ut, quicquid ars aliqua non attingat, id ipsum ex eâdem arte impossibile esse statuunt. Neque vero damnari potest ars, quum ipsa disceptet et judicet. Itaque id agitur, ut ignorantia etiam ab ignominiâ liberetur. Atque quæ tradita et recepta sunt, ad hunc fere modum se habent: quoad opera, sterilia; quæstionum plena; incrementis suis tarda et languida; perfectionem in toto simulantia, sed per partes male impleta; delectu autem popularia et auctoribus ipsis suspecta, ideoque artificiis quibusdam munita et ostentata. Qui autem et ipsi experiri, et se scientiis addere, earumque fines proferre statuerunt, nec illi a receptis prorsus desciscere ausi sunt, nec fontes rerum petere. Verum se magnum quiddam consequutos putant, si aliquid ex proprio inserant et adjiciant; prudenter secum reputantes se in assentiendo modestiam, in adjiciendo libertatem tueri posse. Verum dum opinionibus et moribus consulitur, mediocritates istæ laudatæ in magnum scientiarum detrimentum cedunt: Vix enim datur, auctores simul et admirari, et superare. Sed fit aquarum more, quæ non altius ascendunt quam ex quo descenderunt. Itaque hujusmodi homines emendant nonnulla, sed parum promovent; et proficiunt in melius, non in majus. Neque tamen defuerunt, qui<sup>s</sup>, ausu majore, omnia integra sibi duxerunt, et ingenii impetu usi, priora prosternendo et destruendo, aditum sibi



et placitis suis fecerunt: quorum tumultu non magnopere profectum est; quum philosophiam et artes non re ac opere amplificare, sed placita tantum permutare, atque regnum opinionum in se transferre contenderint; exiguo sane fructu, quum, inter errores oppositos, errandi causæ sint fere communes. Si qui autem nec alienis nec propriis placitis obnoxii, sed libertati faventes, ita animati fuere, ut alios secum simul quærere cuperent; illi sane affectu honesti, sed conatu invalidi fuerunt. Probabiles enim tantum rationes sequuti videntur, et argumentorum vertigine circumaguntur, et promiscuâ quærendi licentiâ severitatem inquisitionis enervant. Nemo autem reperitur, qui in rebus ipsis et experienciâ moram fecerit legitimam. Atque nonnulli rursus, qui experienciæ undis se commiserunt, et fere mechanici facti sunt; tamen in ipsâ experienciâ erraticam quandam inquisitionem exercent, nec ei certâ lege militant: quin et plerique pusilla quædam pensa sibi proposuere, pro magno ducentes, si unum aliquod inventum eruere possint; instituto non minus tenui quam imperito. Nemo<sup>9</sup> enim rei alicujus naturam in ipsâ re recte aut feliciter perscrutatur; verum post laboriosam experimentorum variationem non acquiescit, sed invenit quod ulterius quærat. Neque illud imprimis omittendum est, quod omnis in experiendo industria statim ab initio opera quædam destinata præpropere et intempestivo studio captavit; fructifera (inquam) experimenta, non lucifera, quæsivit; nec ordinem divinum imitata est, qui primo die lucem tantum creavit, eique unum diem integrum attribuit; neque illo die quicquam materiati operis produxit, verum sequentibus diebus ad ea descendit. At qui summas dialecticæ partes tribuerunt, atque inde fidissima scientiis præsidia comparari putarunt, verissime et optime viderunt intellectum humanum, sibi permissum, merito suspectum esse debere. Verum infirmior omnino est malo medicina: nec ipsa mali<sup>10</sup> expers; siquidem dialectica,

quæ recepta est, licet ad civilia, et artes<sup>11</sup> quæ in sermone et opinione positæ sunt, rectissime adhibeatur; naturæ tamen subtilitatem longo intervallo non attingit; et prensando quod non capit, ad errores potius stabiliendos et quasi figendos, quam ad viam veritati aperiendam valuit.

Quare, ut quæ dicta sunt complectamur, non videtur hominibus aut aliena fides aut industria propria circa scientias hactenus feliciter illuxisse; præsertim quum et in demonstrationibus et in experimentis adhuc cognitis, parum sit præsidii. Ædificium autem hujus universi, structurâ suâ, intellectui humano contemplanti, instar labyrinthi est; ubi tot ambigua viarum, tam fallaces rerum et signorum similitudines, tam obliquæ et implexæ naturarum spiræ et nodi, undequaque se ostendunt: iter autem, sub incerto sensû lumine, interdum affulgente, interdum se condente, per experientiæ et rerum particularium sylvas, perpetuo faciendum est. Quin etiam duces itineris (ut dictum est), qui se offerunt, et ipsi implicantur, atque errorum et errantium numerum augent. In rebus tam duris de iudicio hominum ex vi propriâ, aut etiam de felicitate fortuitâ, desperandum est: neque enim ingeniorum quantacunque excellentia, neque experiendi alea sæpius repetita, ista vincere queat. Vestigia filo regenda sunt: omnisque via, usque a primis ipsis sensuum perceptionibus, certâ ratione munienda. Neque hæc ita accipienda sunt, ac si nihil omnino tot seculis, tantis laboribus, actum sit: neque enim eorum, quæ inventa sunt, nos pœnitet. Atque antiqui certe in iis, quæ in ingenio et meditatione abstractâ posita sunt, mirabiles se viros præstiterunt. Verum quæmadmodum seculis prioribus, cum homines in navigando per stellarum tantum observationes cursum dirigebant, veteris sane continentis oras legere potuerunt, aut maria aliqua minora et mediterranea trajicere; priusquam autem oceanus trajiceretur, et novi orbis regiones detegerentur, necesse fuit, usum acûs nauticæ, ut ducem viæ

magis fidem et certum, innotuisse: simili prorsus ratione, quæ hucusque in artibus et scientiis inventa sunt, ea hujusmodi sunt, ut usu, meditatione, observando, argumentando, reperiri potuerint; utpote quæ sensibus propiora sint et communibus notionibus fere subjaceant: antequam vero ad remotiora et occultiora naturæ liceat appellere, necessario requiritur, ut melior et perfectior mentis et intellectûs humani usus et adoperatio introducat.

Nos certe, æterno veritatis amore devicti, viarum incertis, et arduis, et solitudinibus nos commisimus; et, divino auxilio freti et innixi, mentem nostram et contra opinionum violentias et quasi instructas acies, et contra proprias et internas hæsitaciones et scrupulos, et contra rerum caligines et nubes, et undequaque volantes phantasias, sustinuimus; ut tandem magis fida et segura indicia viventibus et posteris comparare possemus. Quâ in re si quid profecerimus, non alia sane ratio nobis viam aperuit, quam vera et legitima spiritûs humani humiliatio. Omnes enim ante nos, qui ad artes inveniendas se applicuerunt, conjectis paulisper in res et exempla et experientiam oculis, statim, quasi inventio nil aliud esset quam quædam excogitatio, spiritus proprios, ut sibi oracula exhiberent, quodammodo invocarunt. Nos vero inter res caste et perpetuo versantes, intellectum<sup>12</sup> longius a rebus non abstrahimus, quam ut rerum imagines et radii (ut in sensu fit) coire possint; unde fit, ut ingenii viribus et excellentiæ non multum relinquatur. Atque quam in inveniendo adhibemus humilitatem, eandem et in docendo sequuti sumus. Neque enim aut confutationum triumphis, aut antiquitatis advocationibus, aut auctoritatis usurpatione quâdam, aut etiam obscuritatis velo, aliquam his nostris inventis majestatem imponere aut conciliare conamur; qualia reperire non difficile esset ei, qui nomini suo, non animis aliorum, lumen affundere conaretur. Non (inquam) ullam aut vim aut insidias hominum judiciis fecimus aut paramus;

verum eos ad res ipsas et rerum fœdera adducimus; ut ipsi videant quid habeant, quid arguant, quid addant, atque in commune conferant. Nos autem, si quâ in re vel male credidimus, vel obdormivimus et minus attendimus, vel defecimus in via et inquisitionem abruptimus; nihilominus iis modis res nudas et apertas exhibemus, ut errores nostri, antequam scientiæ massam altius inficiant, notari et separari possint; atque etiam ut facilis et expedita sit laborum nostrorum continuatio. Atque hoc modo, inter empiricam<sup>13</sup> et rationalem facultatem (quarum morosa et inauspicata divortia et repudia, omnia in humanâ familiâ turbavere) conjugium verum et legitimum, in perpetuum nos firmasse existimamus.

Quamobrem, quum hæc arbitrii nostri non sint, in principio operis, ad Deum Patrem, Deum Verbum, Deum Spiritum, preces fundimus humillimas et ardentissimas, ut, humani generis ærumnarum memores, et peregrinationis istius vitæ, in quâ dies paucos et malos terimus, novis suis eleemosynis per manus nostras familiam humanam dotare dignentur. Atque illud insuper supplices rogamus, ne humana divinis officiant; neve ex reseratione viarum sensûs, et accensione majore luminis naturalis, aliquid incredulitatis et noctis, animis nostris, erga divina mysteria oboriantur: sed potius, ut ab intellectu puro, a phantasiis et vanitate repurgato, et divinis oraculis nihilominus subdito et prorsus dedito, fidei dentur, quæ fidei sunt. Postremo, ut scientiæ veneno, a serpente infuso, quo animus humanus tumet et inflatur, deposito, nec altum sapiamus, nec ultra sobrium, sed veritatem in charitate colamus.

Peractis autem votis, ad homines conversi, quædam et salutaria monemus, et æqua postulamus. Monemus primum (quod etiam precati sumus) ut homines sensum in officio, quoad divina, contineant. Sensus enim (instar solis) globi terrestris faciem aperit, cœlestis claudit et obsignat. Rur-

sus<sup>14</sup>, ne, hujusce mali fugâ, in contrarium peccent; quod certe fiet, si naturæ inquisitionem ulla ex parte, veluti interdico separatam putant. Neque enim pura illa et immaculata scientia naturalis, per quam Adam nomina ex proprietate rebus imposuit, principium aut occasionem lapsui dedit: sed ambitiosa illa et imperativa scientiæ moralis, de bono et malo dijudicantis, cupiditas, ad hoc ut homo a Deo deficeret, et sibi ipsi leges daret, ea demum ratio atque modus tentationis fuit. De scientiis autem, quæ naturam contemplantur, sanctus ille philosophus pronuntiat, “gloriam Dei esse celare rem; gloriam regis autem rem invenire:” non aliter ac si divina natura, innocenti et benevolo puerorum ludo delectaretur, qui ideo se abscondunt ut inveniuntur; atque animam humanam sibi collusorem in hoc ludo, pro suâ in homines indulgentiâ et bonitate, cooptaverit. Postremo omnes in universum monitos volumus, ut scientiæ veros fines cogitent; nec eam aut animi causâ petant, aut ad contentionem, aut ut alios despiciant, aut ad commodum, aut ad famam, aut ad potentiam, aut hujusmodi inferiora, sed ad meritum, et usus<sup>15</sup> vitæ, eamque in charitate perficiant et regant. Ex appetitu enim potentiæ, angeli lapsi sunt; ex appetitu scientiæ, homines: sed charitatis non est excessus; neque angelus aut homo per eam unquam in periculum venit.

Postulata autem nostra, quæ afferimus, talia sunt. De nobis ipsis silemus: de re autem, quæ agitur, petimus; ut homines eam non opinionem, sed opus esse cogitent; ac pro certo habeant, non sectæ nos alicujus, aut placiti, sed utilitatis et amplitudinis humanæ fundamenta moliri. Deinde ut, suis commodis æqui, exutis opinionum zelis et præjudiciis, in commune consulant, ac ab erroribus viarum atque impedimentis, nostris præsiis et auxiliis, liberati et muniti, laborum, qui restant, et ipsi in partem veniant. Præterea, ut bene sperent, neque “Instaurationem” nostram, ut quid-

dam infinitum, et ultra mortale, fingant et animo concipiant: quum revera sit infiniti erroris finis, et terminus legitimus; mortalitatis autem et humanitatis non sit immemor, quum rem non intra unius ætatis curriculum omnino perfici posse confidat, sed successioni destinet; denique scientias, non per arrogantiam in humani ingenii cellulis, sed submisse in mundo majore quærat. Vasta vero, ut plurimum, solent esse, quæ inania: solida contrahuntur maxime, et in parvo sita sunt. Postremo etiam petendum videtur (ne forte quis rei ipsius periculo nobis iniquus esse velit) ut videant homines, quatenus ex eo, quod nobis asserere necesse sit (si modo nobis ipsi constare velimus) de his nostris opinandi, aut sententiam ferendi, sibi jus permissum putent: quum nos omnem istam rationem humanam præmaturam, anticipantem, et a rebus temere, et citius quam oportuit, abstractam, (quatenus ad inquisitionem naturæ) ut rem variam, et perturbatam, et male exstructam, rejiciamus: neque postulandum est, ut ejus judicio stetur, quæ ipsa in judicium vocatur.

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### SINGULARUM ARGUMENTA.

PARS autem instituti nostri est, ut omnia, quantum fieri potest, aperte et perspicue proponantur. Nuditas enim animi, ut olim corporis, innocentiae et simplicitatis comes est. Pateat itaque primo ordo operis, atque ratio ejus. Partes operis a nobis constituuntur sex.

Prima pars exhibet scientiae ejus sive doctrinae, in cujus possessione humanum genus hactenus versatur, summam, sive descriptionem universalem. Visum enim est nobis, etiam in iis quae recepta sunt, nonnullam facere moram: eo nimirum consilio, ut facilius et veteribus perfectio, et novis aditus detur. Pari enim fere studio ferimur et ad vetera excolenda, et ad ulteriora assequenda. Pertinet etiam hoc ad faciendam fidem; juxta illud, "Non accipit indoctus verba scientiae, nisi prius ea dixeris, quae versantur in corde ejus." Itaque scientiarum atque artium recep-

tarum oras legere, necnon utilia quædam in illas importare, tanquam in transitu, non negligemus.

Partitiones tamen scientiarum adhibemus eas, quæ non tantum jam inventa et nota, sed hactenus omissa et debita complectantur. Etenim inveniuntur in globo intellectuali, quemadmodum in terrestri, et culta pariter, et deserta. Itaque nil mirum videri debet, si a divisionibus usitatis quandoque recedamus. Adjectio enim, dum totum variat, etiam partes earumque sectiones necessario variat: receptæ autem divisiones, receptæ summæ scientiarum, qualis nunc est, tantum competunt.

Circa ea vero, quæ ceu omissa notabimus, ita nos geremus, ut non leves tantum titulos et argumenta concisa eorum, quæ desiderantur, proponamus: nam siquid inter omissa retulerimus (modo sit dignioris subjecti) cujus ratio paulo videatur obscurior (adeo ut merito suspicari possimus, homines non facile intellecturos, quid nobis velimus, aut quale sit illud opus, quod animo et cogitatione complectimur): perpetuo nobis curæ erit aut præcepta hujusmodi operis conficiendi, aut etiam partem operis ipsius jam a nobis confectam, ad exemplum totius subjungere; ut in singulis aut opere aut consilio juvemus. Etenim, etiam ad nostram existimationem, non solum aliorum utilitatem, pertinere putavimus; ne quis arbitretur, levem aliquam de istiusmodi rebus notionem mentem nostram perstrinxisse; atque esse illa, quæ desideramus ac prensamus, tanquam votis similia. Ea vero talia sunt, quorum et penes homines (nisi sibi ipsi desint) potestas plane sit, et nos apud nosmet rationem quandam certam et explicatam habeamus. Neque enim regiones metiri animo, ut augures, auspiciorum causâ; sed intrare, ut duces promerendi studio, suscepimus.

Atque hæc prima operis pars est.

PORRO prætervecti artes veteres, intellectum humanum



ad trajiciendum instruemus. Destinatur itaque parti secundæ, doctrina de meliore et perfectiore usu rationis in rerum inquisitione, et de auxiliis veris intellectûs: ut per hoc (quantum conditio humanitatis ac mortalitatis patitur) exaltetur intellectus et facultate amplificetur ad naturæ ardua et obscura superanda. Atque est ea, quam adducimus, ars (quam " Interpretationem naturæ" appellare consuevimus) ex genere logicæ<sup>1</sup>; licet plurimum atque adeo immensum quiddam intersit. Nam et ipsa illa logica vulgaris auxilia<sup>2</sup> et præsidia intellectui moliri ac parare proficitur: et in hoc uno consentiunt. Differt autem plane a vulgari, rebus præcipue tribus: viz. ipso fine, ordine demonstrandi, et inquirendi initiis.

Nam huic nostræ scientiæ finis proponitur; ut inveniantur non argumenta, sed artes; nec principiis consentanea, sed ipsa principia; nec rationes probabiles, sed designationes et indicationes operum. Itaque ex intentione diversâ, diversus sequitur effectus. Illic enim adversarius disputatione vincitur et constringitur: hic natura, opere.

Atque cum hujusmodi fine conveniunt demonstrationum ipsarum natura et ordo. In logicâ enim vulgari opera fere universa circa syllogismum consumitur. De inductione vero dialectici vix serio cogitasse videntur: levi mentione eam transmittentes, et ad disputandi formulas properantes. At nos demonstrationem per syllogismum rejicimus, quod confusius agat, et naturam emittat e manibus. Tametsi enim nemini dubium esse possit, quin, quæ in medio termino conveniunt, ea et inter se conveniant (quod est mathematicæ cujusdam certitudinis); nihilominus hoc subest fraudis, quod syllogismus ex propositionibus constet, propositiones ex verbis<sup>3</sup>, verba autem notionum tesseræ et signa sint. Itaque si notiones ipsæ mentis (quæ verborum quasi anima sunt, et totius hujusmodi structuræ ac fabricæ basis) male ac temere a rebus abstractæ et vagæ, nec satis definitæ et cir-

cumscriptæ, denique multis modis vitiosæ fuerint, omnia ruunt. Rejicimus<sup>4</sup> igitur syllogismum; neque id solum quoad principia (ad quæ nec illi eam adhibent), sed etiam quoad propositiones medias: quas educit sane atque parturit utcunque syllogismus; sed operum steriles, et a practicâ remotas, et plane quoad partem activam scientiarum incompetentes. Quamvis igitur relinquamus syllogismo, et hujusmodi demonstrationibus famosis ac jactatis, jurisdictionem in artes populares et opinabiles (nil enim in hac parte movemus), tamen ad naturam rerum, inductione per omnia, et tam ad minores propositiones quam ad majores, utimur. Inductionem enim censemus eam esse demonstrandi formam, quæ sensum tuetur, et naturam premit, et operibus imminet ac fere immiscetur.

Itaque ordo quoque demonstrandi plane invertitur. Adhuc<sup>5</sup> enim res ita geri consuevit; ut a sensu et particularibus primo loco ad maxime generalia advoletur, tanquam ad polos fixos, circa quos disputationes vertantur; ab illis cætera per media deriventur; viâ certe compendiariâ, sed præcipiti; et ad naturam imperviâ, ad disputationes vero proclivi et accommodatâ. At secundum nos axiomata<sup>6</sup> continenter et gradatim excitantur, ut nonnisi postremo loco ad generalissima veniatur: ea vero generalissima evadunt non notionalia<sup>7</sup>, sed bene terminata; et talia quæ natura ut revera sibi notiora agnoscat, quæque rebus hæreant in medullis.

At in formâ ipsâ quoque inductionis, et judicio quod per eam fit, opus longe maximum movemus. Ea enim, de quâ dialectici loquuntur, quæ procedit per enumerationem<sup>8</sup> simplicem, puerile quiddam est, et precario<sup>9</sup> concludit, et periculo ab instantiâ<sup>10</sup> contradictoriâ exponitur, et consueta<sup>11</sup> tantum intuetur, nec exitum reperit.

Atqui<sup>12</sup> opus est ad scientias inductionis formâ tali, quæ experientiam solvat et separet, et per exclusiones ac re-

jectiones debitas necessario concludat. Quod si iudicium illud vulgatum dialecticorum tam operosum fuerit, et tanta ingenia exercuerit; quanto magis laborandum est in hoc altero, quod non tantum ex mentis penetralibus, sed etiam ex naturæ visceribus extrahitur?

Neque tamen hic finis. Nam fundamenta quoque scientiarum fortius deprimimus et solidamus, atque initia inquirendi altius sumimus, quam adhuc homines fecerunt: ea subjiciendo examini, quæ logica vulgaris tanquam fide alienâ recipit. Etenim dialectici principia scientiarum a scientiis<sup>13</sup> singulis tanquam mutuo sumunt; rursus notiones mentis primas venerantur; postremo informationibus immediatis sensûs bene dispositi acquiescunt. At nos logicam veram singulas scientiarum provincias, majore cum imperio quam penes ipsarum principia<sup>14</sup> sit, debere ingredi decrevimus<sup>15</sup>; atque illa ipsa principia putativa ad rationes reddendas compellere, quousque plane constant. Quod vero attinet ad notiones primas intellectûs; nihil est eorum, quæ intellectus sibi permissus congegit, quin nobis pro suspecto sit, nec ullo modo ratum, nisi novo iudicio se stiterit, et secundum illud pronuntiatum fuerit. Quinetiam sensus ipsius informationes multis modis excutimus. Sensus<sup>16</sup> enim fallunt utique; sed et errores suos indicant: verum errores præsto, indicia eorum longe petita sunt.

Duplex autem est sensûs culpa: aut enim destituit nos, aut decipit. Nam primo, plurimæ sunt res, quæ sensum etiam recte dispositum, nec ullo modo impeditum, effugiunt; aut subtilitate totius corporis, aut partium minutis<sup>17</sup>, aut loci distantia, aut tarditate atque etiam velocitate motus, aut familiaritate objecti, aut alias ob causas. Neque rursus, ubi sensus rem tenet, prehensiones ejus admodum firmæ sunt. Nam testimonium et informatio sensûs semper est ex analogiâ<sup>18</sup> hominis, non ex analogiâ universi: atque magno prorsus errore asseritur, sensum esse mensuram rerum.

Itaque, ut his occurratur, nos multo et fido ministerio auxilia<sup>19</sup> sensui undique conquisivimus et contraximus; ut destitutionibus substitutiones, variationibus rectificationes suppeditentur. Neque id molimur tam instrumentis quam experimentis. Etenim experimentorum longe major est subtilitas quam sensûs ipsius, licet instrumentis exquisitis adjuti (de iis loquimur experimentis, quæ ad intentionem ejus, quod quæritur, perite, et secundum artem excogitata et apposita sunt). Itaque perceptioni sensûs immediatæ ac propriæ non multum tribuimus: sed eo rem deducimus, ut sensus<sup>20</sup> tantum de experimento, experimentum de re judicet. Quare existimamus nos sensûs (a quo omnia in naturalibus petenda sunt, nisi forte libeat insanire) antistites religiosos, et oraculorum ejus non imperitos interpretes nos præstitisse: ut alii professione quâdam, nos re ipsâ sensum tueri ac colere videamur. Atque hujusmodi sunt ea, quæ ad lumen ipsum naturæ, ejusque accensionem et immisionem, paramus: quæ per se sufficere possent, si intellectus humanus æquus et instar tabulæ abrasæ esset. Sed cum mentes hominum miris modis adeo obsessæ sint, ut ad veros rerum radios excipiendos sincera et polita area prorsus desit; necessitas quædam incumbit, ut etiam huic rei remedium quærendum esse putemus.

Idola<sup>21</sup> autem, a quibus occupatur mens, vel adscititia sunt, vel innata. Adscititia vero immigrarunt in mentes hominum, vel ex philosophorum placitis et sectis vel ex perversis legibus demonstrationum. At innata inhærent naturæ ipsius intellectus, qui ad errorem longe proclivior esse deprehenditur quam sensus. Utcunque enim homines sibi placeant, et in admirationem mentis humanæ ac fere adorationem ruant, illud certissimum est; sicut speculum inæquale rerum radios ex figurâ et sectione propriâ immutat, ita et mentem, cum a rebus per sensum patitur, in notionibus suis expediendis et comminiscendis, haud

optimâ fide rerum naturæ suam naturam inserere et immiscere.

Atque priora illa duo idolorum genera ægre, postrema vero hæc nullo modo evelli possunt. Id tantum relinquitur, ut indicentur<sup>22</sup>; atque ut vis ista mentis insidiatrix notetur et convincatur, ne forte a destructione veterum, novi subinde errorum surculi ex ipsâ malâ complexione mentis pullulent; eoque res recidat, ut errores non extinguantur, sed permutentur: verum e contra, ut illud tandem in æternum ratum et fixum sit, intellectum nisi per inductionem, ejusque formam legitimam, judicare non posse. Itaque doctrina ista de expurgatione intellectûs, ut ipse ad veritatem habilis sit, tribus redargutionibus absolvitur: redargutione philosophiarum, redargutione demonstrationum, et redargutione rationis humanæ nativæ. His vero explicatis, ac postquam demum patuerit, quid rerum natura, quid mentis natura ferat; existimamus nos thalamum mentis et universi, pronubâ divinâ bonitate, stravisse et ornasse. Epithalamii autem votum sit, ut ex eo connubio auxilia humana, et stirps inventorum, quæ necessitates ac miserias hominum aliquâ ex parte doment et subigant, suscipiatur. Hæc vero est operis pars secunda.

AT vias non solum monstrare et munire, sed inire quoque, consilium est. Itaque tertia pars operis complectitur Phænomena Universi; hoc est, omnigenam experientiam, atque historiam naturalem, ejus generis, quæ possit esse ad condendam philosophiam fundamentalis. Neque enim excellens aliqua demonstrandi via, sive naturam interpretandi forma, ut mentem ab errore et lapsu defendere ac sustinere, ita ei materiam ad sciendum præbere et subministrare possit. Verum iis, quibus non conjicere et hariolari, sed invenire et scire propositum est; quique non simiolas et fabulas mundorum comminisci, sed hujus ipsius veri mundi

naturam introspicere et velut dissecare<sup>23</sup> in animo habent; omnia a rebus ipsis petenda sunt. Neque huic labori, et inquisitioni, ac mundanæ perambulationi, ulla ingenii, aut meditationis, aut argumentationis substitutio, aut compensatio sufficere potest; non si omnia omnium ingenia coierint. Itaque aut hoc prorsus habendum, aut negotium in perpetuum deserendum. Ad hunc vero usque diem ita cum hominibus actum est, ut minime mirum sit, si natura sui copiam non faciat.

Nam primo, sensûs ipsius informatio, et deserens et fallens: observatio, indiligens et inæqualis, et tanquam fortuita; traditio, vana et ex rumore: practica, operi intenta et servilis: vis experimentalis, cæca, stupida, vaga, et prærupta: denique historia naturalis, levis et inops; vitiosissimam<sup>24</sup> materiam intellectui ad philosophiam et scientias congegesserunt.

Deinde, præpostera argumentandi subtilitas et ventilatio, serum rebus plane desperatis tentat remedium: nec negotium ullo modo restituit, aut errores separat. Itaque nulla spes majoris augmenti ac progressus sita est, nisi in restauratione quâdam scientiarum.

Hujus autem exordia<sup>25</sup> omnino a naturali historiâ sumenda sunt, eâque ipsâ novi cujusdam generis et apparatus. Frustra enim fuerit speculum expolire, si desint imagines: et plane materia idonea præparanda est intellectui, non solum præsidia fida comparanda. Differt vero rursus historia nostra (quemadmodum logica nostra) ab eâ, quæ habetur, multis rebus: fine, sive officio; ipsâ mole et congerie; dein subtilitate; etiam delectu, et constitutione in ordine ad ea, quæ sequuntur.

Primo enim eam proponimus historiam naturalem, quæ non tam aut rerum varietate delectet, aut præsentis experimentorum fructu juvet; quam lucem inventioni causarum affundat, et philosophiæ enutricandæ primam mammam

præbeat. Licet enim opera, atque activam scientiarum partem præcipue sequamur, tamen messis tempus expectamus, nec muscum et segetem herbidam demetere conamur. Satis enim scimus axiomata recte inventa, tota agmina operum secum trahere; atque opera non sparsim, sed confertim exhibere. Intempestivum autem illum et puerilem affectum, ut pignora aliqua novorum operum propere captentur, prorsus damnamus et amovemus, ceu pomum Atalantæ, quod cursum retardat. Atque historiæ nostræ naturalis officium tale est.

Quoad congeriem vero, conficimus historiam non solum naturæ liberæ ac solutæ (cum scilicet illa sponte fluit, et opus suum peragit; qualis est historia cœlestium, meteororum, terræ et maris, mineralium, plantarum, animalium), sed multo magis naturæ constrictæ et vexatæ; nempe, cum per artem et ministerium humanum de statu suo destruitur, atque premitur et fingitur. Itaque omnia artium mechanicarum, omnia operativæ partis liberalium, omnia practicarum complurium, quæ in artem propriam non coaluerunt, experimenta (quantum inquirere licuit, et quantum ad finem nostrum faciunt) perscribimus. Quin etiam (ut, quod res est, eloquamur) fastum hominum et speciosa nil morati, multo plus et operæ et præsidii in hâc parte, quam in illâ alterâ, ponimus: quandoquidem natura rerum magis se prodit per vexationes artis, quam in libertate propriâ.

Neque corporum tantum historiam exhibemus, sed diligentia insuper nostræ esse putavimus, etiam virtutum ipsarum (illarum dicimus, quæ tanquam cardinales in naturâ censeri possint, et in quibus naturæ primordia plane constituuntur; utpote materia<sup>26</sup> primis passionibus ac desideriiis; viz. denso, raro, calido, frigido, consistenti, fluido, gravi, levi, aliisque haud paucis) historiam seorsum comparare.

Enimvero, ut de subtilitate, dicamus plane conquirimus genus experimentorum longe subtilius et simplicius, quam

sunt ea, quæ occurrunt. Complura enim a tenebris educimus et eruimus, quæ nulli in mentem venisset investigare, nisi qui certo et constanti tramite ad inventionem causarum pergeret; cum in se nullius<sup>27</sup> magnopere sint usûs; ut liquido appareat, ea non propter se quæsita esse; sed ita prorsus se habere illa ad res et opera, quemadmodum literæ alphabeti se habeant ad orationem et verba; quæ, licet per se inutiles, eadem tamen omnis sermonis elementa sunt.

In delectu autem narrationum et experimentorum melius hominibus cavisse nos arbitramur, quam qui adhuc in historiâ naturali versati sunt. Nam omnia fide oculatâ, aut saltem perspectâ, et summâ quâdam cum severitate, recipimus: ita ut nil referatur auctum miraculi causâ, sed quæ narramus a fabulis et vanitate casta et intemerata sint. Quinetiam et recepta quæque ac jactata mendacia (quæ mirabili quodam neglectu per secula multa obtinuerunt, et inveterata sunt) nominatim proscribimus et notamus, ne scientiis amplius molesta sint. Quod enim prudenter animadvertit quidam; fabulas et superstitiones, et nugas, quas nutriculæ pueris instillant, mentes eorum etiam serio depravare: ita eadem nos movit ratio, ut solliciti atque etiam anxii simus, ne ab initio, cum veluti infantiam philosophiæ sub historiâ naturali tractemus et curemus, illa alicui vanitati assuescat. At in omni experimento novo et paulo subtiliore, licet (ut nobis videtur) certo ac probato, modum tamen experimenti, quo usi sumus, aperte subjungimus: ut, postquam patefactum sit, quomodo singula nobis constiterint, videant homines quid erroris subesse et adhærere possit; atque ad probationes magis fidas, et magis exquisitas (si quæ sint) expergiscantur: denique ubique monita, et scrupulos, et cautiones aspergimus, religione quâdam et tanquam exorcismo omnia phantasmata ejicientes ac cohibentes.

Postremo, cum nobis exploratum sit, quantopere experi-



entia et historia aciem mentis humanæ disgreget; et quam difficile sit (præsertim animis vel teneris, vel præoccupatis) a principio cum naturâ consuescere; adjungimus sæpius observationes nostras, tanquam primas quasdam conversiones et inclinationes ac veluti aspectus historiæ ad philosophiam: ut et pignoris loco hominibus sint, eos in historiæ fluctibus perpetuo non detentum iri; utque, cum ad opus intellectûs deveniatur, omnia sint magis in procinctu. Atque per hujusmodi (qualem describimus) historiam naturalem, aditum quendam fieri posse ad naturam tutum et commodum, atque materiam intellectui præberi probam et præparatam, censemus.

POSTQUAM vero et intellectum fidissimis auxiliis ac præsidiiis stipavimus, et justum divinorum operum exercitum severissimo delectu comparavimus; nil amplius superesse videtur, nisi ut philosophiam ipsam aggrediamur. Attamen in re tam arduâ et suspensâ sunt quædam, quæ necessario videntur interponenda; partim docendi gratiâ, partim in usum præsentem.

Horum primum est, ut exempla proponantur inquirendi et inveniendi, secundum nostram rationem ac viam, in aliquibus subjectis repræsentata: sumendo ea potissimum subjecta, quæ et inter ea, quæ quærentur, sunt nobilissima, et inter se maxime diversa; ut in unoquoque genere exemplum non desit. Neque de iis exemplis loquimur, quæ singulis præceptis ac regulis, illustrandi gratiâ, adjiciuntur (hoc enim in secundâ parte operis abunde præstitimus); sed plane typos intelligimus et plasmata, quæ universum mentis processum, atque inveniendi continuatam fabricam et ordinem in certis subjectis, iisque variis et insignibus, tanquam sub oculos ponant. Etenim nobis in mentem venit, in mathematicis, astante machinâ, sequi demonstrationem facilem et perspicuam: contra, absque hâc commoditate, omnia videri involuta, et, quam revera sunt, subtiliora. Itaque

hujusmodi exemplis quartam<sup>28</sup> partem nostri operis attribuimus: quæ revera nil aliud est, quam secundæ partis applicatio particularis et explicata.

At quinta pars ad tempus tantum, donec reliqua perficiantur, adhibetur; et tanquam fœnus redditur, usque dum sors haberi possit. Neque enim finem nostrum ita petimus occæcati, ut, quæ occurrunt in viâ utilia, negligamus. Quamobrem quintam partem operis ex iis conficimus, quæ a nobis aut inventa, aut probata, aut addita sunt: neque id tamen ex rationibus atque præscriptis interpretandi; sed ex eodem intellectûs usu, quem alii in inquirendo et inveniendo adhibere consueverunt. Etenim cum, ex perpetuâ nostrâ cum naturâ consuetudine, majora de meditationibus nostris, quam pro ingenii viribus, speramus; tum poterunt ista veluti tabernaculorum in viâ positorum vice fungi, ut mens ad certiora contendens in iis paulisper acquiescat. Attamen testamur interim, nos illis ipsis, quod ex verâ interpretandi formâ non sint inventa, aut probata, teneri minime velle. Istam vero judicii suspensionem, non est quod exhorreat quispiam in doctrinâ, quæ non simpliciter nil sciri posse, sed nil nisi certo ordine et certâ viâ sciri posse asserit; atque interea tamen certos certitudinis gradus ad usum et levamen constituit, donec mens in causarum explicatione consistat. Neque enim illæ ipsæ scholæ philosophorum, qui Acatalepsiam simpliciter tenuerunt, inferiores fuere istis, quæ pronuntiandi licentiam usurparunt. Illæ tamen sensui et intellectui auxilia<sup>29</sup> non paraverunt, quod nos fecimus: sed fidem et auctoritatem plane sustulerunt; quod longe alia res est, et fere opposita.

SEXTA tandem pars operis nostri (cui reliquæ inseruiunt ac ministrant) eam demum recludit et proponit philosophiam, quæ ex hujusmodi (qualem ante docuimus et paravimus) inquisitione legitimâ, et castâ, et severâ educitur et

constituitur. Hanc vero postremam partem perficere et ad exitum perducere, res est et supra vires, et ultra spes nostras collocata. Nos ei initia (ut speramus) non contemnenda, exitum generis humani fortuna dabit; qualem forte homines, in hoc rerum et animorum statu, haud facile animo capere aut metiri queant. Neque enim agitur solum felicitas contemplativa, sed vere res humanæ et fortunæ, atque omnis operum potentia. Homo enim, naturæ minister et interpres<sup>30</sup>, tantum facit et intelligit, quantum de naturæ ordine, opere<sup>31</sup>, vel mente, observaverit: nec amplius scit, aut potest. Neque enim ullæ vires causarum catenam solvere aut perfringere possunt; neque natura<sup>32</sup> aliter, quam parendo, vincitur. Itaque intentiones geminæ illæ, humanæ scilicet scientiæ et potentiæ, vere in idem coincidunt, et frustratio operum maxime fit ex ignorantia causarum.

Atque in eo sunt omnia, siquis, oculos mentis a rebus ipsis nunquam dejiciens, earum imagines, plane ut sunt, excipiat. Neque enim hoc siverit Deus, ut phantasiæ nostræ somnium pro exemplari mundi edamus: sed potius benigne faveat, ut apocalypsim, ac veram visionem vestigiorum et sigillorum Creatoris super creaturas, scribamus.

Itaque tu, Pater, qui lucem visibilem primitias creaturæ dedisti, et lucem intellectualem ad fastigium operum tuorum in faciem hominis inspirasti; opus hoc, quod a tuâ bonitate profectum, tuam gloriam repetit, tuere et rege. Tu, postquam conversus es ad spectandum opera, quæ fecerunt manus tuæ, vidisti quod omnia essent bona valde; et requisivisti. At homo, conversus ad opera, quæ fecerunt manus suæ, vidit quod omnia essent vanitas et vexatio spiritûs; nec ullo modo requievit. Quare si in operibus tuis sudabimus, facies nos visionis tuæ et sabbati tui participes. Supplices petimus, ut hæc mens nobis constet; utque novis eleemosynis, per manus nostras et aliorum quibus eandem mentem largieris, familiam humanam dotatam velis.

DE

DIGNITATE ET AUGMENTIS SCIENTIARUM.

LIBER QUINTUS.



CAPUT PRIMUM.

PARTITIO DOCTRINÆ CIRCA USUM ET OBJECTA FACULTATUM ANIMÆ HUMANÆ, IN LOGICAM, ET ETHICAM. PARTITIO LOGICÆ, IN ARTES INVENIENDI, JUDICANDI, RETINENDI, ET TRADENDI.

DOCTRINA circa intellectum, rex optime, atque illa altera circa voluntatem hominis, in natalibus suis tanquam gemellæ sunt. Etenim illuminationis puritas, et arbitrii libertas, simul inceperunt, simul corruerunt. Neque datur in universitate rerum tam intima sympathia, quam illa veri et boni. Quo magis rubori fuerit viris doctis, si scientiâ sint tanquam angeli alati, cupiditatibus vero tanquam serpentes qui humi reptant; circumgerentes animas, instar speculi sane, sed menstruati.

Venimus jam ad doctrinam circa usum et objecta facultatum animæ humanæ. Illa<sup>1</sup> duas habet partes, easque notissimas, et consensu receptas; logicam et ethicam: nisi quod doctrinam civilem, quæ vulgo ut pars ethicæ collocatur, jam ante emancipaverimus; et in integram doctrinam de homine congregato<sup>2</sup>, sive in societate, constituerimus; hic tantum de homine segregato tractantes. Logica de intellectu et ratione; ethica de voluntate, appetitu, et affecti-

bus disserit: altera decreta, altera actiones progignit. Verum quidem est, quod phantasia in utrâque provinciâ, tam iudiciali quam ministeriali, legati cujusdam, aut internuncii, aut procuratoris reciproci vices gerit. Nam sensus idola omnigena phantasiæ tradit, de quibus postea ratio iudicat: at ratio vicissim idola electa et probata phantasiæ transmittit, priusquam fiat executio decreti. Siquidem motum voluntarium perpetuo præcedit, eumque incitat, phantasia; adeo ut phantasia sit utrique tam rationi quam voluntati instrumentum commune: nisi quod Janus iste bifrons sit, et duas obvertat facies: facies enim rationem aspiciens, veritatis habet effigiem; facies autem actionem aspiciens, effigiem bonitatis; quæ tamen sint facies,

——“ Quales decet esse sororum.”

Neque vero merus et nudus internuncius est phantasia; sed auctoritatem non exiguam vel accipit, vel usurpat, præter delationem simplicem mandati. Recte enim Aristoteles, “ Id imperii habet anima in corpus, quod dominus in mancipium; ratio vero in phantasiam, quod in liberâ civitate magistratus in civem;” ad quem possit suâ vice redire dominatio. Videmus enim quod in iis, quæ sunt fidei et religionis, phantasia supra ipsam rationem scandat et evehatur: non quod illuminatio divina locum habeat in phantasiâ (quin potius in ipsâ arce mentis et intellectûs) verum quemadmodum gratia divina in virtutibus utitur motibus voluntatis; ita similiter gratia divina in illuminationibus utitur motibus phantasiæ; unde fit ut religio semper aditum sibi ac viam ad animum quæsierit per similitudines, typos, parabolas, visiones, insomnia. Rursus<sup>5</sup> haud humile est regnum phantasiæ in persuasionibus, a vi eloquentiæ insinuatis. Nam ubi per orationis artificia hominum animi demulcentur, inflammantur, et in quamcunque partem pertrahuntur; totum illud fit per exsuscitationem phantasiæ, quæ,

impotens jam facta, non solum rationi insultat, verum eidem vim quodammodo facit, partim occæcando, partim extimulando. Neque tamen causa videtur, cur a partitione priore discedamus. Nam phantasia scientias fere non parit; siquidem poësis (quæ a principio phantasiæ attributa est) pro lusu potius ingenii, quam pro scientiâ, habenda. Potestatem autem phantasiæ in naturalibus, doctrinæ de animâ paulo ante assignavimus: eam vero quam habet cum rhetoricâ cognationem, illi ipsi arti (de quâ infra tractabimus) remitti par est.

Pars ista humanæ philosophiæ, quæ ad logicam spectat, ingeniorum plurimorum gustui ac palato minus grata est; et nihil aliud videtur, quam spinosæ subtilitatis laqueus ac tendicula. Nam sicut vere dicitur scientiam esse animi pabulum: ita in hoc pabulo appetendo et deligendo plerique palatum nacti sunt Israëlitarum simile in deserto; quos cupido incessit redeundi ad ollas carniû, mannæ autem fastidium cepit; quæ licet cibus fuerit cœlestis, minus tamen sentiebatur almus et sapidus. Eodem modo (ut plurimum) illæ scientiæ placent, quæ habent infusionem nonnullam carniû magis esulentam: quales sunt historia civilis, mores, prudentia politica, circa quas hominum cupiditates, laudes, fortunæ vertuntur et occupatæ sunt. At istud lumen siccum<sup>4</sup> plurimorum mollia et madida ingenia offendit et torret. Cæterum unamquamque rem propriâ si placet dignitate metiri, rationales scientiæ reliquarum omnino claves sunt: atque quemadmodum manus instrumentum instrumentorum, anima forma formarum, ita et illæ artes<sup>5</sup> artium ponendæ sunt: neque solum dirigunt, sed et roborant; sicut sagittandi usus et habitus non tantum facit ut melius quis collinet, sed ut arcum tendat fortio-rem.

Artes logicæ quatuor<sup>6</sup> numero sunt; divisæ ex finibus suis, in quos tendunt. Id enim agit homo in rationalibus: aut ut inveniatur, quod quæsierit; aut judicet, quod inve-

nerit; aut retineat, quod judicaverit; aut tradat, quod retinuerit. Necesse igitur est, ut totidem sint artes rationales: ars inquisitionis seu inventionis; ars examinis seu iudicii; ars custodiae seu memoriae; et ars elocutionis seu traditionis. De quibus jam sigillatim dicemus.

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### CAPUT SECUNDUM.

PARTITIO INVENTIVÆ IN INVENTIVAM ARTIUM ET ARGUMENTORUM:  
 QUODQUE PRIOR HARUM (QUÆ EMINET) DESIDERETUR. PARTITIO  
 INVENTIVÆ ARTIUM IN EXPERIENTIAM LITERATAM, ET  
 ORGANUM NOVUM. DELINEATIO EXPERIENTIÆ LITERATÆ.

INVENTIONIS duæ sunt species, valde profecto inter se discrepantes: una, artium et scientiarum; altera, argumentorum et sermonum. Priorem harum desiderari prorsus pronuncio; qui quidem talis mihi videtur esse defectus, ac si quis, in inventario conficiendo bonorum alicujus defuncti, ita referat; numeratæ pecuniæ nihil. Ut enim cætera omnia pecuniâ parantur, ita et per hanc artem reliquæ acquiruntur. Atque, sicut India occidentalis nunquam nobis inventa fuisset, nisi præcessisset acûs nauticæ inventio; licet regiones illæ immensæ, versoriæ motus pusillus sit: ita non est cur miretur quispiam, in artibus perlustrandis et promovendis ampliores progressus factos non esse; quandoquidem ars ipsa inveniendi et perlustrandi scientias hactenus ignoratur.

Hanc scientiæ desiderari partem plane in confesso est. Primo enim dialectica nihil profitetur, imo ne cogitat quidem, de inveniendis artibus, sive mechanicis, sive (quas vocant) liberalibus; aut etiam de illarum operibus, harum vero axiomatibus, eliciendis; sed quasi præteriens homines alloquitur, et dimittit, edicens, ut cuique in suâ arte cre-

dant. Celsus, vir prudens, non solum medicus, (licet moris sit omnibus in laudes artis propriæ effundi) graviter et ingenue, de empiricis et dogmaticis medicorum sectis loquens, fatetur; “Medicamenta et remedia prius fuisse inventa, de causis vero et rationibus posterius disceptatum; non, ordine converso, causas ex naturâ rerum primo erutas fuisse, easque inventioni remediorum præluxisse.” At Plato non semel innuit “Particularia infinita esse; maxime rursus generalia minus certa documenta exhibere: medullam igitur scientiarum, quâ artifex ab imperito distinguitur, in mediis propositionibus consistere, quas per singulas scientias tradidit et docuit experientia.” Quin et illi, qui de primis inventoribus, aut scientiarum originibus, verba fecerunt, casum potius, quam artem, celebrarunt; atque animalia bruta, quadrupedes, aves, pisces, serpentes, magis quam homines, tanquam scientiarum doctores introduxerunt:

“Dictamnium genitrix Crætæa carpit ab Ida,  
 Puberibus caulem foliis, et flore comantem  
 Purpureo: non illa feris incognita capris  
 Gramina, cum tergo volucres hæseret sagittæ.”

ÆNEID, xii. 412.

Adeo ut minime mirum sit (cum in more apud antiquos fuerit rerum utilium inventores<sup>8</sup> consecrare) apud Ægyptios, gentem priscam (cui plurimæ artes initia sua debent), templa plena fuisse simulacris brutorum; hominum vero simulacris prope vacua;

“Omnigenumque deum monstra, et latrator Anubis,  
 Contra Neptunum, et Venerem, contraque Minervam, etc.”

ÆNEID, viii. 698.

Quod si malis, ex traditione Græcorum, artes potius hominibus ut inventoribus tribuere; haudquaquam tamen dixeris Prometheus ad ignis inventionem contemplationes adhibuisse; aut, cum silicem primo percuteret, scintillas expec-



tasse: sed casu in illud incidisse, atque (ut aiunt) furtum Jovi fecisse. Ita ut, ad artium inventionem quod attinet, capræ sylvestri pro emplastris, philomelæ pro modulationibus musicis, ibidi<sup>9</sup> pro lavationibus intestinorum, operculo ollæ, quod dissiliit, pro re tormentariâ, denique (ut verbo dicamus) casui aut cuivis alteri rei plus debeamus quam dialecticæ. Nec vero multo aliter se habet modus ille inveniendi, quem recte describit Virgilius: Georg. i. 133.

“Ut varias usus meditando extunderet artes  
Paulatim.”

Non enim alia hic proponitur inveniendi methodus, quam cujus bruta ipsa sunt capacia, et quam crebro usurpant: nimirum attentissima circa unam rem sollicitudo, ejusque perpetua exercitatio, quas sui conservandi necessitas hujusmodi animantibus imponit. Cicero enim vere admodum; “Usus uni rei deditus, et naturam et artem sæpe vincit.” Quare si prædicetur de hominibus,

— “Labor omnia vincit

Improbis, et duris urgens in rebus egestas:”

etiam de brutis similiter quæritur,

“Quis expedivit psittaco suum Χαῖρε?”

Corvo quis auctor fuit, ut magnâ siccitate lapillos immitteret arbori cavæ, ubi aquam forte conspexerit, ut surgentem laticem rostro posset attingere? Quis viam monstravit apibus, qui per aërem, tanquam vastum mare, agros floridos, licet multum ab alvearibus dissitos, solent petere, et favos suos denuo repetere? Quis formicam docuit, ut grana in colliculo suo reponenda circumroderet prius, ne reposita germinarent, et spem suam illuderent? Quod si in versu illo Virgiliano quis notet verbum illud *extundere*, quod difficultatem rei; et verbum illud *paulatim*, quod tarditatem innuit; redibimus unde profecti sumus, ad Ægyptiorum

illos deos; cum hactenus homines modice rationis facultate, neutiquam vero officio artis, usi sint ad inventa detegenda.

Secundo, hoc ipsum quod asserimus (si advertatur paulo diligentius) demonstrat inductionis forma, quam proponit dialectica; quâ scilicet scientiarum principia inveniuntur et probentur; quæ vitiosa plane est et incompetens, et naturam tantum abest ut perficiat<sup>10</sup>, ut etiam eam pervertat et detorqueat. Qui enim modum acute introspexerit, quo ros iste æthereus scientiarum, similis illi de quo loquitur poëta,

“Aerei mellis cœlestia dona,”

colligatur (cum et scientiæ ipsæ ex exemplis singulis, partim naturalibus, partim artificialibus, tanquam prati floribus et horti, extrahantur) reperiet profecto animum suapte sponte, et nativâ indole, inductionem solertius conficere, quam quæ describitur a dialecticis; siquidem ex nudâ enumeratione particularium (ut dialectici solent), ubi non invenitur instantia contradictoria, vitiose concluditur; neque aliquid aliud hujusmodi inductio producit, quam conjecturam probabilem. Quis enim in se recipiet, cum particularia, quæ quis novit, aut quorum meminit, ex unâ tantum parte compareant, non delitescere aliquod, quod omnino repugnet? Perinde ac si Samuel acquievisset in illis Isai filiis, quos coram adductos videbat in domo; et minime quæsisisset Davidem, qui in agro aberat. Atque hæc inductionis forma (si verum omnino dicendum sit) tam pinguis est et crassa, ut incredibile videatur, tam acuta et subtilia ingenia (qualia in his rebus meditationes suas exercuerunt) potuisse eam mundo obtrudere; nisi illud in causâ fuisset, quod operâ festinatâ ad theorias et dogmata contendissent: particularia autem (præsertim moram in iis longiorem) ex fastu quodam et elatione animi, despexissent. Illi enim exempla, sive instantias particulares, vice lictorum aut viatorum adhibuerunt ad summovendam turbam, ut dogmatibus suis viam

aperirent; neutiquam autem ea inde ab initio in consilium advocarunt, ut legitima fieret et matura de rerum veritate deliberatio. Certe perculserit animos pia et religiosa quædam admiratio, cum videamus eadem calcata vestigia, ad errorem ducentia, in divinis et humanis. Quemadmodum enim in divinâ veritate percipiendâ ægre quis in animum inducat, ut fiat tanquam parvulus; ita in humanâ perdiscedâ, provectos utique, puerorum more, prima inductionum elementa adhuc legere et retractare, res humilis existimatur et quasi contemnenda.

Tertio, si concedatur, principia scientiarum ex inductione, quâ utuntur, vel sensu et experientiâ, recte posse constitui; certissimum est tamen, axiomata inferiora ab iis per syllogismum non posse (in rebus naturalibus, quæ participant ex materiâ) recte et tuto deduci. (In syllogismo<sup>11</sup> enim fit reductio propositionum ad principia per propositiones medias. (Hæc autem sive inveniendi sive probandi forma in scientiis popularibus (veluti ethicis, politicis, legibus, et hujusmodi) locum habet: imo et in theologicis; quandoquidem Deo pro bonitate suâ placuerit captui humano se accommodare: at in physicis, ubi natura opere, non adversarius argumento constringendus est, elabitur plane veritas ex manibus; propter longe majorem naturalium operationum quam verborum subtilitatem: adeo ut, succumbente syllogismo, inductionis (veræ scilicet et emendatæ) officio ubique opus sit, tam ad principia magis generalia, quam ad propositiones inferiores.) Nam syllogismi ex propositionibus consistunt; propositiones ex verbis; verba notionum tesseræ sunt. Quare si notiones ipsæ (quæ verborum animæ sunt) male et varie a rebus abstrahantur<sup>12</sup>, tota fabrica corrui. Neque laboriosa vel consequentiarum argumentorum, vel veritatis propositionum examinatio, rem in integrum unquam restituet; cum error sit (ut loquuntur medici) in digestionem primâ, quæ a functionibus sequentibus non rectificatur. Non igitur absque

*Abstrahantur.*

*= Major.*

*= not premises*

magnâ et evidenti causâ evenit, ut complures ex philosophis (aliqui autem eorum maxime insignes) academici fuerint et sceptici, qui scientiæ humanæ et syllepsium certitudinem sustulerunt, ultra verisimilitudinem aut probabilitatem negantes eam pertingere. Inficias non iverim, visum esse nonnullis, Socratem, cum scientiæ certitudinem a se amoveret, per ironiam tantum hoc fecisse, et scientiam dissimulando simulasse; renunciando scilicet iis, quæ manifesto sciebat, ut eo modo etiam quæ nesciebat scire putaretur. Neque etiam in recentiore<sup>13</sup> academiâ (quam amplexus est Cicero) illa opinio acatalepsis admodum sincere culta fuit. Etenim qui eloquentiâ floruerunt, hanc fere sectam sibi desumpserunt, ut in utramque partem copiose disserendi gloriam assequerentur: unde a viâ illâ-rectâ, per quam ad veritatem pergere debuissent, tanquam ad deambulationes quasdam amœnas, animi causâ institutas, deflexum est. Constat tamen, nonnullos sparsim in utrâque academiâ (veteri et novâ), multo magis inter scepticos, acatalepsiam istam simpliciter et integre tenuisse. Verum in hoc maxime ab illis peccatum est, quod sensuum perceptiones calumniabantur; unde scientias radicitus evellebant. Sensus vero, licet sæpenumero homines aut fallant, aut destituunt, possint tamen, multâ adjuti industriâ, ad scientias sufficere; idque non tam ope instrumentorum (licet et hæc quoque aliquâ ex parte prosint) quam experientiarum ejus generis, quæ objecta subtiliora, quam pro sensûs facultate, ad objecta sensu comprehensibilia producere queant. Debuerant autem potius defectum hâc in parte imputasse mentis tum erroribus, tum contumaciæ (quæ rebus ipsis morigera esse recusat), et pravis demonstrationibus, et modis ratiocinandi et concludendi ex perceptione sensuum, perperam institutis. Hæc autem loquimur, non quo intellectui detrahatur, aut negotium totum deseratur, sed quo intellectui auxilia comoda comparentur et subministrentur, quibus rerum ardua

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et naturæ obscuritatem vincere possunt. Nemo enim tantâ pollet manus constantiâ, aut etiam habitu, ut rectam lineam ducere, aut perfectum circulum circumscribere, manu liberâ possit; quod tamen ope regulæ<sup>14</sup>, aut circini, facere in promptu est. Hæc igitur res ipsa est, quam paramus, et ingenti conatu molimur; ut scilicet mens per artem fiat rebus par; utque inveniatur ars quædam indicii et directionis, quæ cæteras artes, earumque axiomata, atque opera detegat, et in conspectum det. Hanc enim merito desiderari posuimus.

Ars ista indicii (ita enim eam appellabimus) duas habet partes: aut enim defertur indicium ab experimentis ad experimenta; aut ab experimentis ad axiomata, quæ et ipsa nova experimenta designent. Priorem harum Experientiam Literatam nominabimus, posteriorem vero Interpretationem<sup>15</sup> Naturæ, sive Novum Organum. Prior quidem (ut alibi attingimus) vix pro arte habenda est, aut parte philosophiæ, sed pro sagacitate quâdam; unde etiam eam Venationem<sup>16</sup> Panis (hoc nomen ex fabulâ mutuati) quandoque appellamus: attamen quemadmodum possit quis, in viâ suâ, triplici<sup>17</sup> modo progredi; aut cum palpat ipse in tenebris; aut cum alterius manu ducatur, ipse parum videns; aut denique cum vestigia lumine adhibito regat: similiter cum quis experimenta omnigena absque ullâ serie aut methodo tentet, ea demum mera est palpatio: cum vero nonnullâ utatur in experimentando directione et ordine, perinde est, ac si manu ducatur. Atque hoc illud est, quod per Experientiam Literatam intelligimus: nam lumen ipsum, quod tertium fuit, ab Interpretatione Naturæ, sive Novo Organo, petendum est.

Literata Experientia, sive Venatio Panis, modos experimentandi tractat: eam (cum desiderari posuerimus, neque res sit plane perspicua) pro more et instituto nostro aliquâtenus adumbrabimus. Modus experimentandi præcipue procedit, aut per variationem experimenti; aut per produc-

tionem experimenti; aut per translationem experimenti; aut per inversionem experimenti; aut per compulsionem experimenti; aut per applicationem experimenti; aut per copulationem experimenti; aut denique per sortes experimenti. Universa vero ista cohibita sunt citra terminos axiomatis alicujus inveniendi. Illa enim altera pars de Novo Organo, omnem transitionem experimentorum in axiomata, aut axiomatum in experimenta, sibi vindicat.

Variatio<sup>18</sup> experimenti fit primo in materiâ; scilicet, quando experimentum in jam cognitis certæ materiæ fere adhæsit; nunc vero in illis, quæ similis sunt speciei, tentetur: veluti confectio papyri in pannis linteis tantum probata est, in sericis minime (nisi forte apud Chineses), neque rursus in filaceis, compositis ex setis et pilis, ex quibus conficitur (quod vocamus) camelotum; neque denique in laneis, gossypio, et pellibus; quanquam hæc tria postrema magis esse videntur heterogenea. Itaque admisceri possint potius, quam per se utilia esse. Item insitio in arboribus fructiferis in usu est, in arboribus sylvestribus raro tentata; licet perhibeatur ulmum in ulmum insitam miras producere foliorum umbras. Insitio etiam in floribus rara admodum est, licet hoc jam cœperit fieri in rosis muscatellis, quæ rosis communibus feliciter inoculantur. Etiam variationem in parte rei, inter variationes in materiâ ponimus. Videmus enim, surculum in trunco arboris insitum feliciter pullulare, quam si terræ indatur. Cur non et semen cepæ capiti alterius cepæ viridis inditum, feliciter germinet, quam si nudæ terræ commissum fuerit? Atque hic radix pro trunco variatur, ut hæc res insitio quædam in radice videri possit. Variatio experimenti fit secundo in efficiente: radii solis per specula comburentia, calore ita intenduntur, ut materiam, quæ ignem facile concipiat, accendere possint: num et radii lunæ, per eadem, ad lenissimum aliquem gradum teporis actuari

possunt, ut videamus, utrum corpora omnia cœlestia sint potestate calida? Item calores radiosi, per specula scilicet, intenduntur: num etiam calores opaci (quales sunt lapidum et metallorum antequam candeant) idem patiuntur; an potius sunt luminis in hâc re partes nonnullæ? Item succinum et gagates fricata paleas trahunt; num etiam et ad ignem tepefacta? Variatio experimenti fit tertio in quanto: circa quod diligens admodum est adhibenda cura, cum hoc multi circumstent errores. Credunt enim homines, auctâ aut multiplicatâ quantitate, pro ratâ augeri aut multiplicari virtutem. Et hoc fere postulant et supponunt, tanquam res sit mathematicæ cujusdam certitudinis; quod omnino falsissimum est. Globus plumbeus unius libræ a turri demissus (puta) decem pulsuum spatio, ad terram descendit: num globus duarum librarum (in quo impetus iste, motus, quem vocant, naturalis, duplicari debet) spatio quinque pulsuum terram feriet? At ille æquali fere tempore descendet, neque accelerabitur juxta rationem quanti. Item sulphuris (puta) drachma una semilibræ chalybis admixta, eam fluere faciet et colliquari: num igitur uncia sulphuris, quatuor libris chalybis, ad colliquationem sufficiet? At illud non sequitur. Certum enim est, obstinationem materiæ in patiente, per quantitatem, augeri amplius, quam activitatem virtutis in agente. Porro nimium æque fallit ac parum. Etenim in excoctionibus et depurationibus metallorum, error est familiaris, ut ad excoctionem promovendam, aut calorem fornacis, aut additamenti, quod injiciunt, molem augeant. At illa supra modum aucta operationem impediunt; propterea quod vi et acrimoniâ suâ multum ex metallo puro in fumos vertant et asportent; ut et jactura fiat; et massa, quæ remanet, magis sit obstinata et dura. Debent igitur homines ludibrium illud mulieris Æsopi cogitare: quæ sperarat, ex duplicatâ mensurâ hordei gallinam suam duo ova quotidie

parituram: at illa impinguata nullum peperit. Prorsus non tutum fuerit alicui experimento naturali confidere, nisi facta fuerit probatio, et in minore, et in majore quanto. Atque de variatione experimenti hactenus.

Productio experimenti duplex; repetitio, et extensio: nimirum, cum aut experimentum iteratur, aut ad subtilius quiddam urgetur. Repetitionis exemplum tale sit. Spiritus vini fit ex vino per destillationem unicam; estque vino ipso multo acrior et fortior: num etiam spiritus vini ipse destillatus sive sublimatus, se ipsum fortitudine æque superabit? At repetitio quoque non absque fallaciâ est: etenim, tum secunda exaltatio, prioris excessum non æquat; tum etiam sæpenumero per iterationem experimenti, post statum sive acmen quandam operationis, tantum abest ut progrediatur natura, ut potius relabatur. Judicium igitur in hâc re adhibendum. Item argentum vivum, in linteo, aut alias in medio plumbi liquefacti, cum refrigescere cœperit, insertum, stupefit; nec amplius fluit: num et idem argentum vivum, si sæpius immissum fuerit, ita figetur, ut fiat malleabile? Extensionis exemplum tale sit: aqua in summo posita, et pensilis facta, et per rostrum vitri oblongum in vinum dilutum immersa, separabit aquam a vino: vino in summum se paulatim recipiente, aquâ in imo subsidente: num etiam, quemadmodum vinum et aqua (corpora scilicet diversa) hoc ingenio separantur, possint quoque partes vini (corporis nimirum integri) subtiliores a crassioribus separari; ut fiat tanquam destillatio, per pondus, et in summo reperiatur aliquid spiritui vini proximum, sed forte delicatius? Item magnes ferrum integrum trahit: num etiam frustum magnetis in dissolutione ferri immersum, ferrum ad se alliciet, et se ferro obducat? Item versorium acûs nauticæ se ad polos mundi applicat: num etiam eâdem viâ et consecutione, quâ cœlestia? Videlicet, ut si quis acum in contrario



situ, hoc est, in puncto australi ponat, et paulisper teneat, ac deinde vim omittat: num forte acus ad septentriones se conferet, eligendo potius rotare per occidentem in situm desideratum, quam per orientem? Item, aurum argentum vivum, juxta positum, imbibit: num vero aurum recipit illud argentum vivum intra se, sine extensione molis suæ, ut fiat massa quædam ipso auro ponderosior? Item, homines memoriæ serviunt, collocando imagines personarum in locis. Num etiam idem assequantur, missis locis, et affingendo actiones aut habitus personis? Atque de productione experimenti hactenus.

Translatio experimenti triplex: aut a naturâ vel casu in artem: aut ab arte vel practicâ aliâ in aliam: aut a parte alicujus artis in partem diversam ejusdem. Translationis a naturâ aut casu in artem innumera sunt exempla: adeo ut omnes fere artes mechanicæ, a tenuibus initiis, naturâ aut casu præbitis, ortum habuerint. Adagio receptum erat, "botrum contra botrum citius maturescere:" id quod de mutuis amicitia operis et officiis increbuit. At nostri cydræ (vini scilicet ex pomis) confectores, hoc optime imitantur. Cavent enim ne poma tundantur aut exprimantur, antequam, nonnullo tempore in acervos conjecta, mutuo contactu maturuerint; unde nimia potûs aciditas emendetur. Item, Iridum artificiosarum imitatio ex aspersione spissâ guttularum, ab iridibus naturalibus ex nube roscidâ, facili ductu translata est. Item, modus destillandi, vel ex alto peti, ex imbribus scilicet, aut rore; vel ex humili illo experimento guttarum, in patinis ollis aquæ bullientis superimpositis, adhærentium, desumi potuit. Tonitrua autem et fulgura imitari veritus quis esset, nisi operculum monachi illius chemici, magno impetu et fragore, subito in sublime jactum, submonuisset. Verum quo hæc res magis exemplis abundet, eo pauciora adducere opus fuerit. Debuerant autem homines, si illis utilia inquirere vacaret, naturalia opificia et operationes

singulas, attente, et minutim, et ex composito intueri; et secum perpetuo, et acriter cogitare, quænam ex ipsis ad artes transferri possit. Speculum enim artis natura: nec pauciora sunt experimenta, quæ ab arte in artem, seu a practicâ in practicam, transferri possunt; licet hoc rarius in usu sit. Natura enim ubique omnibus occurrit; at artes singulæ artificibus tantum propriis cognitæ sunt. Specilla ocularia ad visum debilem iuvandum inventa sunt: num et comminisci quis queat aliquod instrumentum, quod auribus appensum surdastris ad audiendum juvet? Item, imbal-samationes et mel cadavera conservant; annon possit aliquid ex his in medicinam transferri, quod etiam vivis corporibus prosit? Item, sigillorum practica in cerâ, cæmentis, et plumbo, antiqua fuit: at hæc etiam impressioni in chartis, sive arti typographicæ, viam monstravit. Item, sal in co-quinariâ carnes condit, idque melius hieme, quam æstate. Annon hoc ad balnea utiliter transferri possit, eorumque temperamentum, quando opus fuerit, vel imprimendum, vel extrahendum? Item, sal in nupero experimento, de con-glaciationibus artificialibus, magnas vires ad condensan-dum obtinere reperitur: annon possit hoc transferri ad condensationes metallorum: cum jampridem notum sit, aquas fortes, ex nonnullis salibus compositas, dejicere et præcipitare arenulas auri ex metallis aliquibus auro ipso minus densis? Item pictoria imagine memoriam rei reno-vat: annon hoc traductum est in artem eam, quam vocant, memoriæ? De his in genere monitum sit; quod nihil ad imbrem quendam inventorum utilium, eorundemque novo-rum, veluti cœlitus deducendum, tantum valere possit, quantum, si experimenta complurium artium mechanica-rum, uni homini aut paucis, qui se invicem colloquiis acuere possint, in notitiam venerint: ut per hanc, quam dicimus, experimentorum translationem, artes se mutuo fovere, et veluti commixtione radiorum accendere possint. Quamvis

enim via rationalis per Organum longe majora spondeat; attamen hæc sagacitas, per Experimentiam Literatam, plurima interim ex iis, quæ in proximo sunt, in genus humanum, tanquam missilia apud antiquos donativa, projiciet et sparget. Superest illa translatio de parte artis in partem diversam; quæ parum differt a translatione de arte in artem: verum quia artes nonnullæ spatia magna occupant, ut etiam translationem experimentorum ferre intra se ipsas possint, hanc etiam speciem translationis subjungere visum est: præcipue, quia magni prorsus est in nonnullâ arte momenti. Plurimum enim ad artem medicinæ amplificandum profuerit, si experimenta partis illius medicinæ de curationibus morborum ad partes illas de tuendâ sanitate, et prolongatione vitæ, transferantur. Si enim opiatum aliquod insigne ad spirituum, in morbo pestilenti, furibundam incensionem reprimendam suffecerit, non dubitet quispiam, quin simile aliquod, debitâ dosi familiare redditum, etiam incensionem eam gliscentem, et obrepentem, quæ per ætatem fit, aliquâ ex parte frænare et retardare possit. Atque de translatione experimenti hactenus.

Inversio experimenti fit, cum contrarium ejus quod experimento constat, probatur. Exempli gratiâ: calidum per specula intenditur: num etiam frigidum? Item, calidum se diffundendo, fertur tamen potius in sursum: num etiam frigidum se diffundendo, fertur magis in deorsum? Exempli gratiâ: accipias bacillum ferreum, illudque in uno fine calefacias; et deinde erigas ferrum, parte calefactâ subtus locatâ; in -superiore parte manu appositâ, actutum manum aduret; parte autem calefactâ supra locatâ, et manu subtus, multo tardius aduret. Num etiam, si totum bacillum calefiat, et finis alter nive, vel spongiâ, in aquâ frigidâ tincta, madesiat: si nix aut spongia superius locetur, num (inquam) frigus deorsum mittet citius, quam inferius locata, sursum? Item, radii solis supra album dissiliunt, supra nigrum con-

gregantur: num etiam umbræ super nigrum disperduntur, super album congregantur? Id quod in loco tenebroso, luce per foramen exiguum tantum immissâ, fieri videmus, ubi imagines rerum, quæ foras sunt, super papyrum, quæ alba est, excipiuntur, super nigram minime. Item, vena frontis ad dolorem hemicranicum inciditur: num etiam hemicranium scarificatur ad sodam? Atque de inversione experimenti hactenus.

Compulsio experimenti fit, ubi urgetur et producitur experimentum, ad annihilationem vel privationem virtutis: in reliquis enim venationibus, fera capitur tantum; at in istâ, occiditur. Exemplum compulsionis tale est. Magnes ferrum trahit: urge ergo ferrum, aut urge magnetem, ut amplius non fiat attractio: veluti, num forte si magnes ustus fuerit, aut in aquis fortibus maceratus, virtutem suam deponet, aut saltem remittet? Contra, si chalybs aut ferrum in crocum martis redigantur, vel in chalybem, quem vocant præparatum, vel etiam in aquâ forti solvantur, num adhuc ea alliciat magnes? Rursus; Magnes ferrum trahit per universa, quæ novimus, media; nempe si interponatur aurum, argentum, vitrum. Urge igitur aliquod medium, si fieri possit, quod virtutum intercipiat: probetur argentum vivum: probentur oleum, gummi, carbo ignitus, et alia, quæ adhuc probata non sunt. Item, introducta sunt nuper perspicilla, quæ visibilia minuta miris modis multiplicent. Urge usum eorum, vel ad species tam pusillas, ut amplius non valeant: vel ita grandiusculas, ut confundantur. Scilicet, num poterint illa in urinâ clare detegere ea, quæ alias non perspicerentur? Num poterint in gemmis, ex omni parte puris et nitidis, grana aut nubeculas conspicienda dare? Num et pulviscula in sole (quæ Democrito pro atomis suis, et principiis rerum, falsissime objiciebantur) tanquam corpora grandiuscula monstrare? Num pulverem crassiusculum, ex cinnabari, et cerussâ, ita ostendere distributum, ut appa-

reant hic granula rubra, illic alba? Num rursus, imagines majores (puta faciem, oculum, etc.) in tantum multiplicatas ostendere, in quantum pulicem, aut vermiculum? Num byssam, aut hujusmodi textile linteum delicatius, et paulo apertius, ita foraminatum ostendere, ac si esset rete? Verum in compulsionibus experimentorum minus moramur, quia fere extra limites *Experientiæ Literatæ* cadunt, et ad causas, et axiomata, et *Novum Organum* potius spectant. Ubicunque enim fit negativa, aut privativa, aut exclusiva; cœpit jam præberi lux nonnulla ad inventionem formarum<sup>19</sup>. Atque de compulsione experimenti hactenus.

Applicatio experimenti nihil aliud est, quam ingeniosa traductio ejus ad experimentum aliud aliquod utile. Exemplum tale sit. Corpora quæque suas habent dimensiones, sua pondera: aurum plus ponderis, minus dimensionis, quam argentum; aqua quam vinum. Ab hoc traducitur experimentum utile, ut ex mensurâ impletâ et pondere excepto, possis dignoscere quantum argenti fuerit admixtum auro, vel aquæ vino. Quod fuit *Εὔρηκα* illud Archimedis. Item, carnes in nonnullis cellis citius putrefiunt quam in aliis: utile fuerit experimentum hoc traducere ad dignoscendos aëres, magis aut minus salubres ad habitationem; ubi scilicet carnes diutius vindicentur a putredine: possit idem applicari ad revelandas salubriores aut pestilentiores tempestates anni. Verum innumera sunt ejusmodi. Evigilent modo homines: et oculos perpetuo, alias ad naturam rerum, alias ad usus humanos vertant. Atque de applicatione experimenti hactenus.

Copulatio experimenti est applicationum nexus et catena; cum, quæ singula profutura non fuissent ad usum aliquem, connexa valeant. Exempli gratiâ; rosas aut fructus serotinos habere cupis; hoc fiet, si gemmas præcociores avellas; idem fiet, si radices, usque ad ver adultum, denudes, et aëri exponas; at multo magis si copuletur utrumque. Item,

ad refrigerandum maxime faciunt glacies, et nitrum; utrumque commixtum multo magis. Verum et hæc res per se perspicua est. Attamen fallacia ei sæpe subesse possit (ut et omnibus, ubi desunt axiomata), si copula fiet ex rebus, quæ diversis, et quasi pugnantibus modis operantur. Atque de copulatione experimenti hactenus.

Restant sortes<sup>20</sup> experimenti. Hic vero experimentandi modus plane irrationalis est, et quasi furiosus; cum aliquid experiri velle animum subeat, non quia aut ratio, aut aliquid aliud experimentum te ad illud deducat, sed prorsus, quia similis res adhuc nunquam tentata fuit. Haud tamen scio an in hâc ipsâ re (de quâ nunc agimus) non aliquid magni<sup>21</sup> lateat: si, inquam, omnem lapidem in naturâ moveas. Magnalia enim naturæ fere extra vias tritas et orbitas notas jacent, ut etiam absurditas rei aliquando juvet. At si ratio simul comitetur, id est, ut et manifestum sit, simile experimentum nunquam tentatum fuisse, et tamen causa subsit magna, cur tentetur; tum vero hæc res ex optimis est, et plane sinus naturæ excutit. Exempli gratiâ: in operatione ignis super aliquod corpus naturale, alterum horum hâctenus semper evenit, ut aut aliquid evolet (veluti flamma et fumus, in combustionem vulgari) aut saltem fiat separatio partium localis, et ad nonnullam distantiam, ut in destillatione, ubi fæces subsident, vapores in receptacula, postquam luserint, congregantur. At destillationem clausam (ita enim eam vocare possumus) nemo mortalium adhuc tentavit; verisimile autem videtur vim caloris, si intra claustra corporis sua in alterando edat facinora; cum nec jactura fiat corporis, nec etiam liberatio; tum demum hunc materiæ Proteum, veluti manicis detentum, ad complures transformationes adacturam, si modo calor ita temperetur et alternetur, ut non fiat vasorum confractio. Est enim hæc res matriçi similis naturali,\* ubi calor operatur, nihil corporis aut emittitur aut separatur: nisi quod in

matrice conjungatur alimentatio; verum quatenus ad versionem eadem res videtur. Tales igitur sunt sortes experimenti.

Illud interim, circa hujusmodi experimenta monemus; ut nemo animo concidat, aut quasi confundatur, si experimenta, quibus incumbit, expectationi suæ non respondeant. Etenim quod succedit, magis complacet; at quod non succedit, sæpenumero non minus informat<sup>22</sup>. Atque illud semper in animo tenendum, (quod perpetuo inculcamus) experimenta lucifera etiam adhuc magis quam fructifera ambienda esse. Atque de Literatâ Experimentiâ hæc dicta sint, quæ (ut jam ante diximus) sagacitas potius est, et odoratio quædam venatica, quam scientia. De Novo Organo autem silemus, neque de eo quicquam prælibamus; quoniam de eo (cum sit res omnium maxima) opus integrum (annuente favore divino) conficere nobis in animo est.

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### CAPUT TERTIUM.

PARTITIO INVENTIVÆ ARGUMENTORUM IN PROMPTUARIAM ET TOPICAM. PARTITIO TOPICÆ, IN GENERALEM ET PARTICULAREM. EXEMPLUM TOPICÆ PARTICULARIS, IN INQUISITIONE DE GRAVI ET LEVI.

INVENTIO argumentorum, inventio proprie non est. Invenire enim est ignota detegere, non ante cognita recipere aut revocare. Hujusce autem inventionis usus atque officium non aliud videtur, quam ex massâ scientiæ, quæ in animo congesta et recondita est, ea, quæ ad rem aut quæstionem institutam faciunt, dextere depromere. Nam cui parum aut nihil de subjecto, quod proponitur, innotuit, ei loci inventionis non prosunt; contra, cui domi paratum est, quod ad rem adduci possit, is etiam absque arte, et locis

inventionis, argumenta tandem (licet non ita expedite et commode) reperiet et producet. Adeo ut hoc genus inventionis (sicut diximus) <sup>discovery</sup> inventio proprie non sit; sed <sup>What it is</sup> reductio tantum in memoriam, sive suggestio cum applicatione. Attamen, quoniam vocabulum invaluit et receptum est, vocetur sane inventio; siquidem etiam feræ alicujus venatio et inventio, non minus cum illa intra vivariorum septa indagetur, quam cum in saltibus apertis, dici possit. Missis vero verborum scrupulis, illud constet, scopum et finem hujusce rei esse promptitudinem quandam et expeditum usum cognitionis nostræ, potius quam ejusdem amplificationem aut incrementum.

Atque ut parata sit ad disserendum copia, duplex ratio iniri potest. Aut ut designetur et quasi indice monstretur, ad quas partes rem indagare oporteat; atque hæc est ea, quam vocamus topicam. Aut ut jam antea composita sint, et in usum reposita argumenta, circa eas res, quæ frequentius incidunt et in disceptationem veniunt; atque hanc promptuariam nominabimus. Hæc autem posterior tanquam scientiæ pars vix dici meretur, cum in diligentiam potius consistat, quam in eruditione aliquâ artificiosâ. Veruntamen hæc in parte Aristoteles, ingeniose quidem, sed tamen damnose, sophistas sui temporis deridet, inquit: "Perinde illos facere, ac si quis calcearium professus, rationem calcei conficiendi non doceret, sed exhiberet tantum calceos complurimos, diversæ tam formæ quam magnitudinis." Attamen hic regerere liceat; calcearium, si in officinâ nil calceorum haberet, neque eos consueret nisi rogatus; egenum prorsus mansurum, et perpauca inventurum emptores. Sed longe aliter Salvator noster, de divinâ scientiâ verba faciens, inquit, "Omnis scriba doctus in regno cælorum similis est homini patrifamilias, qui profert de thesauro suo nova et vetera." Videmus etiam, priscos rhetores oratoribus præcepisse, ut præsto haberent locos communes varios, jam



pridem adornatos, et in utramque partem tractatos et illustratos: exempli gratia, Pro sententiâ legis adversus verba legis; et e contra: Pro fide argumentorum adversus testimonia; et e contra. Cicero autem ipse, longâ doctus experientiâ, plane asserit, posse oratorem diligentem et sedulum jam præmeditata et elaborata habere, quæcunque in disceptationem venient: adeo ut in causæ ipsius actione, nihil novum, aut subitum inseri necesse fuerit, præter nomina nova, et circumstantias aliquas speciales. At Demosthenis diligentia et sollicitudo eo usque processit, ut quoniam primus ad causam aditus et ingressus ad animos auditorum præparandos plurimum virium haberet, operæ pretium putaret complura concionum et orationum exordia componere et in promptu habere. Atque hæc exempla et auctoritates merito Aristotelis opinioni præponderare possint, qui nobis auctor foret ut vestiarium cum forfice commutarem. Itaque non fuit omittenda hæc pars<sup>23</sup> doctrinæ circa promptuariam, de quâ hoc loco satis. Cum enim sit utriusque, tam logicæ quam rhetoricæ, communis; visum est eam hic inter logica cursim tantum perstringere; plenior ejus tractationem ad rhetoricam rejicientes.

Partem alteram inventivæ (nimirum topicam) partiemur in generalem et particularem. Generalis illa est, quæ in dialecticâ diligenter et abunde tractata est; ut in ejus explicatione morari non sit opus. Illud tamen obiter monendum videtur, topicam istam non tantum in argumentationibus, ubi cum aliis manum conserimus; verum et in meditationibus, cum quid nobiscum ipsi commentamur aut revolvimus, valere. Imo, neque solummodo in hoc sitam esse, ut inde fiat suggestio aut admonitio, quid affirmare, aut asserere; verum etiam quid inquirere aut interrogare debeamus. At prudens interrogatio<sup>24</sup> quasi dimidium scientiæ. Recte siquidem Plato, "Qui aliquid quærit, id ipsum, quod quærit, generali quâdam notione comprehen-

dit: aliter, qui fieri potest, ut illud, cum fuerit inventum, agnoscat?" Ideirco quo amplior et certior fuerit anticipatio nostra, eo magis directa et compendiosa erit investigatio. Iidem igitur illi loci, qui ad intellectûs nostri sinus intra nos excutiendos, et congestam illic scientiam depromendam, conducent, etiam ad scientiam extrinsecus hauriendam juvabunt: ita ut si præsto fuerit quis rei gnarus et peritus, commode et prudenter de eâ interrogari a nobis possit; et similiter auctores, et libri, et partes librorum, qui nos de iis, quæ quærimus, edoceant et informant, utiliter deligi et evolvi.

o. At topica particularis ad ea, quæ dicimus, longe confert magis, et pro re fructuosissimâ habenda est. Illius certe mentio levis a nonnullis scriptoribus facta est; sed integre et pro rei dignitate minime tractata. Verum missum facientes vitium illud et fastum, quæ nimium diu regnarunt in scholis; videlicet, ut quæ præsto sint, infinitâ subtilitate persequantur, quæ paulo remotiora, ne attingant quidem: nos sane topicam particularem, tanquam rem apprime utilem, amplectimur; hoc est, locos inquisitionis et inventionis particularibus subjectis et scientiis appropriatos. Illi autem mixturæ quædam sunt ex logicâ et materiâ ipsâ propriâ singularum scientiarum. Futilem enim esse constat, et angusti cujusdam animi, qui existimet artem de scientiis inveniendis, perfectam jam a principio, excogitari et proponi posse; eandemque postea in opere poni et exerceri debere. At certo sciant<sup>25</sup> homines, artes inveniendi solidas et veras adolescere et incrementa sumere cum ipsis inventis: adeo ut, cum quis primum ad perscrutationem scientiæ alicujus accesserit, possit habere præcepta inventivæ nonnulla utilia: postquam autem ampliores in ipsâ scientiâ progressus fecerit, possit etiam et debeat nova inventionis præcepta excogitare, quæ ad ulteriora eum feliciter deducant. Similis est sane hæc res viæ inîtæ in planitie: post-

quam enim viæ partem aliquam fuerimus emensi, non tantum hoc lucrati sumus, ut ad exitum itineris propius accesserimus; verum etiam ut, quod restat viæ, clarius prospiciamus: eodem modo, in scientiis, gradus itineris quisque, ea, quæ a tergo reliquit, prætervectus, etiam illa quæ supersunt propius dat in conspectum. Hujus autem topicæ exemplum, quoniam eam inter desiderata reponimus, subjungere visum est.

TOPICA<sup>26</sup> PARTICULARIS, SIVE ARTICULI INQUISITIONIS DE GRAVI  
ET LEVI.

1. Inquiratur, qualia sint corpora, quæ motûs gravitatis sunt susceptibilia; qualia, quæ levitatis; et si quæ sint mediæ, sive adiaphoræ naturæ?

2. Post inquisitionem de gravitate et levitate simplicem, procedatur ad inquisitionem comparatam; quæ nimirum ex gravibus plus, quæ minus ponderent, in eodem dimenso? Etiam, quæ ex levibus celerius ferantur in altum, quæ tardius?

3. Inquiratur de eo, quid possit et operetur quantum corporis ad motum gravitatis? Atqui videatur hoc primo aspectu quasi supervacuum; quia rationes motûs debeant sequi rationes quanti. Sed res aliter se habet: nam licet in lancibus quantitas gravitatem corporis ipsius compenset (viribus corporis undique coëuntibus per repercussionem, sive resistentiam lancium vel trabis) tamen ubi parva datur resistentia (veluti in decasu corporum per aërem) quantum corporis parum valet ad incitationem descensûs; cum viginti pondo plumbi et libra una, eodem fere spatio cadant.

4. Inquiratur utrum quantum corporis ita augeri possit, ut motus gravitatis prorsus deponatur; ut fit in globo terræ, qui pensilis est, non cadit? Utrum igitur possint esse alia massæ tam grandes, ut se ipsæ sustentent? Nam latio ad centrum terræ res fictitia est; atque omnis massa grandis

motum lationis quemcunque exhorret, nisi ab alio appetitu fortiori vincatur.

5. Inquiratur de eo, quid possit et operetur resistentia corporis medii, vel occurrentis, ad regimen motûs gravitatis? Corpus vero descendens aut penetrat et secat corpus occurrens, aut ab eo sistitur. Si penetret, fit penetratio; aut cum levi resistentiâ, ut in aëre; aut cum fortiori, ut in aquâ. Si sistatur, sistitur aut resistentiâ dispari, ubi fit prægravatio, ut si lignum superponatur ceræ; aut æquâ, veluti si aqua superponatur aquæ, aut lignum ejusdem generis ligno; id quod appellat schola (apprehensione quadam inani) “Non ponderare corpus nisi extra locum suum.” Atque hæc omnia motum gravitatis variant: aliter enim moventur gravia in lancibus, aliter in decasu: etiam aliter (quod mirum videri possit) in lancibus pendentibus in aëre, aliter in lancibus immersis in aquâ; aliter in decasu per aquam; aliter in natantibus sive vectis super aquam.

6. Inquiratur de eo, quid possit et operetur figura corporis descendens ad regendum motum gravitatis; veluti figura lata cum tenuitate, cubica, oblonga, rotunda, pyramidalis; et quando se vertant corpora, quando eâdem, quâ dimittuntur, positurâ permaneant?

7. Inquiratur de eo, quid possit et operetur continuatio et progressio ipsius casûs sive descensûs ad hoc, ut majori incitatione et impetu feratur; et quâ proportionem et quousque invalescat illa incitatio? Siquidem veteres levi contemplatione opinati sunt (cum motus naturalis sit iste) eum perpetuo augeri et intendi.

8. Inquiratur de eo, quid possit et operetur distantia aut proximitas corporis descendens a terrâ, ad hoc, ut celerius cadat, aut tardius, aut etiam non omnino (si modo fuerit extra orbem activitatis globi terræ; quæ Gilberti opinio fuit) atque simul de eo, quid operetur immersio corporis descendens magis in profundum terræ, aut collocatio ejus-

dem propius ad superficiem terræ? Etenim hæc res etiam motum variat, ut operantibus in mineris perspectum est.

9. Inquiratur de eo, quid possit et operetur differentia corporum, per quæ motus gravitatis diffunditur et communicatur: atque utrum æque communicetur per corpora mollia et porosa, ac per dura et solida: veluti si trabs lancis sit ex alterâ parte lingulæ lignea, ex alterâ argentea (licet fuerint reductæ ad idem pondus) utrum non progignat variationem in lancibus? Similiter, utrum metallum, lanæ aut vesicæ inflatæ superimpositum, idem ponderet, quod in fundo lancis?

10. Inquiratur de eo, quid possit et operetur in communicatione motûs gravitatis distantia corporis a libramine: hoc est, cita et sera perceptio incubitûs sive depressionis: veluti in lancibus; ubi altera pars trabis est longior (licet reducta ad idem pondus) an inclinet hoc ipsum lancem? Aut in tubis arcuatis, ubi longior pars certe trahet aquam, licet brevior pars (facta scilicet capacior) majus contineat pondus aquæ.

11. Inquiratur de eo, quid possit intermixtio sive copulatio corporis levis cum corpore gravi, ad elevandam corporis gravitatem, ut in pondere animalium vivorum et mortuorum?

12. Inquiratur de secretis ascensibus et descensibus partium leviorum et graviorum in uno corpore integro: unde fiant sæpe accuratæ separationes; ut in separatione vini et aquæ; in ascensione floris lactis, et similibus.

13. Inquiratur, quæ sit linea et directio motûs gravitatis, et quâtenus sequatur vel centrum terræ, id est, massam terræ; vel centrum corporis ipsius, id est, nixum partium ejus. Centra enim illa ad demonstrationes apta sunt, in naturâ nihil valent.

14. Inquiratur de comparatione motûs gravitatis cum motibus aliis; quos scilicet vincat, quibus cedat? Veluti in

motu (quem appellant) violento, motus gravitatis compescitur ad tempus: etiam, cum pondus longe majus ferri ab exiguo magnete attollitur, cedit motus gravitatis motui sympathiæ.

15. Inquiratur de motu aëris, utrum feratur sursum, an sit tanquam adiaphorus? Quod difficile est inventu, nisi per experimenta aliqua exquisita: nam emicatio aëris in fundo aquæ fit potius per plagam aquæ, quam per motum aëris, cum idem etiam fiat in ligno. Aër autem aëri commixtus nihil prodit, cum non minus levitatem exhibeat aër in aëre, quam gravitatem aqua in aquâ: in bullâ autem, exili obducta pelliculâ, ad tempus stat.

16. Inquiratur, quis sit terminus levitatis? Neque enim quemadmodum centrum terræ posuerunt centrum gravitatis, volunt (credo) ut ultima convexitas cœli sit terminus levitatis. An potius, veluti gravia videntur eousque ferri, ut decumbant, et tanquam ad immobile; ita levia eousque ferantur, ut rotari incipiant, et tanquam ad motum sine termino?

17. Inquiratur quid in causâ sit, cur vapores et halitus eousque in altum, ac sita est regio (quam vocant) media aëris, ferantur; cum et crassiusculæ sint materiæ, et radii solis per vices (noctu scilicet) cessent?

18. Inquiratur de regimine motûs flammæ in sursum; quod eo abstrusius est, quia singulis momentis flamma perit, nisi forte in medio flammarum majorum; etenim flammæ abruptæ a continuitate suâ parum durant.

19. Inquiratur de motu in sursum ipsius activitatis calidi; veluti cum calor in ferro candente citius gliscit in sursum, quam in deorsum.

Exemplum igitur topicæ particularis tale sit: illud interim, quod monere ocepimus, iterum monemus, nempe ut homines debeant topicas particulares suas alternare, ita ut, post majores progressus aliquos in inquisitione factos, aliam

et subinde aliam instituunt topicam, si modo scientiarum fastigia conscendere cupiant. Nos autem topicis particularibus tantum tribuimus, ut proprium opus de ipsis, in subjectis naturalibus dignioribus et obscurioribus, conficere in animo habeamus. Domini enim quæstionum sumus, rerum non item. Atque de Inventivâ hactenus.

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### CAPUT QUARTUM.

PARTITIO ARTIS JUDICANDI IN JUDICIUM PER INDUCTIONEM, ET PER SYLLOGISMUM. QUORUM PRIUS AGGREGATUR ORGANO NOVO. PARTITIO PRIMA JUDICII PER SYLLOGISMUM IN REDUCTIONEM RECTAM ET INVERSAM. PARTITIO SECUNDA EJUS IN ANALYTICAM, ET DOCTRINAM DE ELENCHIS. PARTITIO DOCTRINÆ DE ELENCHIS IN ELENCHOS SOPHISMATUM, ELENCHOS HERMENÆ, ET ELENCHOS IMAGINUM, SIVE IDOLORUM. PARTITIO IDOLORUM IN IDOLA TRIBUS, IDOLA SPECUS, ET IDOLA FORI. APPENDIX ARTIS JUDICANDI, VIDELICET DE ANALOGIA DEMONSTRATIONUM PRO NATURA SUBJECTI.

TRANSEAMUS nunc ad iudicium, sive artem iudicandi, in quâ agitur de naturâ probationum sive demonstrationum. In arte autem istâ iudicandi (ut etiam vulgo receptum est) aut per inductionem, aut per syllogismum concluditur: nam enthymemata et exempla<sup>27</sup> illorum duorum compendia tantum sunt. At quatenus ad iudicium, quod fit per inductionem, nihil est, quod nos detinere debeat: uno siquidem eodemque mentis opere illud, quod quæritur, et invenitur et iudicatur. Neque enim per medium aliquod res transigitur, sed immediate, eodem fere modo, quo fit in sensu. Quippe sensus, in objectis suis primariis, simul et objecti speciem arripit, et ejus veritati consentit. Aliter autem fit in syllogismo<sup>28</sup>; cujus probatio immediata non est, sed per medium perficitur. Itaque alia<sup>29</sup> res est inventio medii, alia

judicium de consequentiâ argumenti. Nam primo discurret mens, postea acquiescit. At inductionis formam vitiosam prorsus valere jubemus; legitimam ad Novum Organum remittimus. Itaque de judicio per inductionem hoc loco satis.

De illo altero per syllogismum quid attinet dicere, cum subtilissimis ingeniorum limis hæc res fere attrita sit, et in multas minutias redacta? Nec mirum, cum sit res, quæ cum intellectu humano magnam habeat sympathiam. Nam animus humanus miris modis ad hoc contendit et anhelat, ut non pensilis sit, sed nanciscatur aliquid fixum et immobile, cui, tanquam firmamento, in transcursibus et disquisitionibus suis, innitatur. Sane quemadmodum Aristoteles probare conatur inveniri in omni motu corporum aliquid quod quiescit; et fabulam antiquam de Atlante, qui ipse erectus cælum humeris sustinuit, pereleganter ad polos mundi traducit, circa quos conversiones expediuntur: similiter magno studio appetunt homines aliquem habere intra se cogitationum Atlantem, aut polos, qui intellectûs fluctuationes et vertigines aliquatenus regant; timentes scilicet, ne cælum ipsorum ruat. Itaque ad principia scientiarum constituenda præpropere festinarunt, circa quæ omnis disputationum varietas verteretur, sine periculo ruinæ et casûs; nescientes profecto eum, qui certa nimis propere captaverit, in dubiis finiturum: qui autem judicium tempestive cohiberit, ad certa preventurum.

Manifestum est igitur, artem hanc judicandi per syllogismum nihil aliud esse, quam reductionem propositionum ad principia per medios terminos. Principia autem consensu recepta intelliguntur, atque a quæstione eximuntur. At terminorum mediorum inventio libero ingeniorum acumini et investigationi permittitur. Est autem reductio illa duplex, directa scilicet, et inversa. Directa est, cum ipsa propositio ad ipsum principium reducitur: id quod probatio ostensiva vocatur. Inversa est, cum contradictoria propo-



sitionis reducitur ad contradictorium principii; quod vocant probationem per incommodum. Numerus vero terminorum mediorum, sive scala eorum, minuitur aut augetur, pro motione propositionis a principio.

His positis, partiemur <sup>per syllogismum</sup> artem judicii (sicut vulgo fere solet) in analyticam, et doctrinam de elenchis: altera indicat, altera cavet; analytica enim veras formas instituit de consequentiis argumentorum, a quibus si varietur, sive deflectatur, vitiosa deprehenditur esse conclusio: atque hoc ipsum in se elenchum quendam sive redargutionem continet. Rectum enim (ut dicitur) et sui index est, et obliqui. Tutissimum<sup>30</sup> nihilominus est elenchos veluti monitores adhibere, quo facilius detegantur fallaciæ, iudicium alioquin illaqueaturæ. In analyticâ vero nihil desiderari reperimus; quin potius oneratur superfluis, quam indiget accessionibus.

Doctrinam de elenchis in tres partes dividere placet; elenchos sophismatum, elenchos hermenia, et elenchos imaginum sive idolorum. Doctrina de elenchis sophismatum apprimè utilis est; quamvis enim pinguius fallaciarum genus a Senecâ non inscite comparetur cum præstigiatorum technis; in quibus, quo pacto res geratur, nescimus; aliter autem se habere rem, quam videtur, satis novimus; subtiliora tamen sophismata non solum id præstant, ut non habeat quis quod respondeat, sed et iudicium ipsum serio confundunt.

Hæc pars de elenchis sophismatum præclare tractata est ab Aristotele quoad præcepta: etiam a Platone adhuc melius, quoad exempla; neque illud tantum in personâ sophistarum antiquorum (Gorgia, Hippia, Protagora, Euthydemus, et reliquorum) verum etiam in personâ ipsius Socratis, qui cum illud semper agat, ut nihil affirmet, sed a cæteris in medium adducta infirmet, ingeniosissime objectionum, fallaciarum, et redargutionum modos expressit. Itaque in hæc parte nihil habemus, quod desideremus. Illud interim no-

per syllogismum  
but it would include  
a class from

tandum; quamvis usum hujus doctrinæ probum et præcipuum in hoc posuerimus, ut redarguantur sophismata; liquido nihilominus patere, usum ejus degenerem et corruptum ad captiones et contradictiones per illa ipsa sophismata struendas et concinnandas spectare. Quod genus facultatis etiam pro eximio habetur, et haud parvas affert utilitates. Licet eleganter introducta sit a quopiam illa differentia inter oratorem et sophistam; quod alter tanquam leporarius cursu præstet; alter tanquam lepus ipse flexu.

Sequuntur elenchi hermenia<sup>31</sup>: ita enim (vocabulum potius quam sensum ab Aristotele mutuantes) eos appellabimus. Redigamus igitur hominibus in memoriam ea, quæ a nobis de transcendentibus, et de adventitiis entium conditionibus sive adjunctis, (cum de philosophiâ primâ<sup>32</sup> ageremus) superius dicta sunt. Ea sunt, majus, minus; multum, paucum; prius, posterius; idem, diversum; potentia, actus; habitus, privatio; totum, partes; agens, patiens; motus, quies; ens, non ens; et similia. Imprimis autem meminerint et notent differentes eas, quas diximus, harum rerum contemplationes: videlicet quod possint inquiri vel physice, vel logice. Physicam autem circa eas tractationem philosophiæ primæ assignavimus. Superest logica: ea vero ipsa est res, quam in præsentī doctrinam de elenchis hermenia nominamus. Portio certe est hæc doctrinæ sana et bona. Hoc enim habent notiones illæ generales et communes, ut in omnibus disputationibus ubique intercurrant; adeo ut nisi accurate, et anxio cum judicio, bene jam ab initio distinguantur, universo disputationum lumini caliginem miris modis offusuræ sint; et eo rem fere deducturæ, ut desinant disputationes in pugnas verborum. Etenim æquivocationes, et malæ acceptiones verborum (præsertim hujus generis) sunt sophismata sophismatum. Quare etiam melius visum est istarum tractationem seorsum constituere, quam eam vel in philosophiam primam sive

*Advective*

*Transcendentes*

*Advective*

metaphysicam<sup>33</sup> recipere, vel ex parte analyticæ subijcere, ut Aristoteles satis confuse fecit. Dedimus autem ei nomen ex usu, quia verus ejus usus est plane redargutio et cautio circa usum verborum. Quinimo partem illam de prædicamentis<sup>34</sup>, si recte instituatur, circa cautiones de non confundendis aut transponendis definitionum et divisionum terminis præcipuum usum sortiri existimamus, et huc etiam referri malumus. Atque de elenchis hermenæ hæctenus.

Ad elenchos vèro imaginum sive idolorum quod attinet, sunt quidem idola<sup>35</sup> profundissimæ mentis humanæ fallaciæ. Neque enim fallunt in particularibus, ut cæteræ, judicio caliginem offundendo, et tendiculas struendo; sed plane ex prædispositione mentis pravâ, et perperam constitutâ, quæ tanquam omnes intellectûs anticipationes detorquet et inficit. Nam mens humana (corpore obducta et obfusata) tantum abest ut speculo plano, æquali, et claro similis sit (quod rerum radios sincere excipiat et reflectat), ut potius sit instar speculi alicujus incantati, pleni superstitionibus et spectris. Imponuntur autem intellectui idola, aut per naturam ipsam generis humani generalem; aut per naturam cujusque individualem; aut per verba, sive naturam communicativam. Primum genus idola tribûs; secundum idola specûs; tertium idola fori, vocare consuevimus. Est et quartum genus, quod idola theatri<sup>36</sup> appellamus, atque superinductum est a pravis theoriis sive philosophiis, et perversis legibus demonstrationum: verum hoc genus abnegari potest et deponi; itaque illud in præsentia omittemus. At reliqua plane obsident mentem, neque prorsus evelli possunt. Igitur non est, quod quis in istis analyticam aliquam expectet; sed doctrina de elenchis est circa ipsa idola doctrina primaria. Neque (si verum omnino dicendum sit) doctrina de idolis in artem redigi possit; sed tantum adhibenda est, ad ea cavenda, prudentia quædam contemplativa. Ho-

*innate**fori**adscititia*

rum autem tractationem plenam et subtilem ad Novum Organum amandamus; pauca generaliter tantum de iis hoc loco dicturi.

*ex processu rationis* Idolorum<sup>37</sup> tribus exemplum tale sit. Natura intellectus humani magis afficitur affirmativis et activis, quam negativis<sup>38</sup> et privativis, cum rite et ordine æquum se utrique præbere debeat. At ille, si res quæpiam aliquando existat et teneat, fortiorem recipit de eâ impressionem, quam si eadem longe pluries fallat, aut in contrarium eveniat. Id quod omnis superstitionis et vanæ credulitatis quasi radix est. Itaque recte respondit ille, qui, cum suspensa tabula in templo monstraretur eorum, qui vota solverant, quod naufragii periculum effugissent, atque interrogando premeretur, annon tum demum Neptuni numen agnosceret? quæsit vicissim, At ubi sunt illi depicti, qui post vota nuncupata perierunt? Atque eadem est ratio superstitionum similium, sicut in astrologicis, insomniis, ominibus, et reliquis. Alterum exemplum est hujusmodi; Animus<sup>39</sup> humanus (cum sit ipse substantia æqualis et uniformis) majorem præsupponit et affingit in naturâ rerum æqualitatem et uniformitatem, quam revera est. Hinc commentum mathematicorum, in cœlestibus omnia moveri per circulos<sup>40</sup> perfectos, rejiciendo lineas spirales: hinc etiam fit, quod, cum multa sint in naturâ monodica, et plena imparitatis, affingat tamen semper cogitatio humana, relativa, parallela, et conjugata; ab hoc enim fonte elementum ignis cum orbe suo introductum est ad constituendum quaternionem cum reliquis tribus, terrâ, aquâ, aëre. Chemicis autem fanaticam instruxerunt rerum universarum phalangem, inanissimo commento inveniri fingentes, in quatuor illis suis elementis (cœlo, aëre, aquâ, et terrâ) species singulas parallelas invicem et conformes. Tertium exemplum est superiori finitimum: quod homo fiat quasi norma et speculum naturæ:

*ex analogia*

neque enim credibile est (si singula percurrantur et notentur) quantum agmen idolorum philosophiæ immiserit naturalium operationum ad similitudinem actionum humanarum reductio: hoc ipsum, inquam, quod putetur talia naturam facere qualia homo facit. Neque multo meliora sunt ista, quam hæresis anthropomorphitarum, in cellis ac solitudine stupidorum monachorum orta: aut sententia Epicuri<sup>41</sup> huic ipsi in paganismo respondens, qui diis humanam figuram tribuebat. At non opus fuit Velleio Epicureo interrogare, Cur Deus cælum stellis et luminibus, tanquam ædilis, ornasset? Nam si summus ille opifex ad modum ædilis se gessisset, in pulchrum aliquem et elegantem ordinem stellas digerere debuisset, operosis palatiorum laquearibus consimilem; cum e contra ægre quis ostendat, in tam infinito stellarum numero figuram aliquam vel quadratam, vel triangularem, vel rectilinearem. Tanta est harmoniæ discrepantia inter spiritum hominis et spiritum mundi.

Quod<sup>42</sup> ad idola specûs attinet, illa ortum habent ex propriâ cujusque naturâ et animi et corporis; atque etiam ex educatione et consuetudine, et fortuitis rebus, quæ singulis hominibus accidunt. Pulcherrimum enim emblema est illud de specu<sup>43</sup> Platonis: siquidem si quis (missâ illâ exquisitâ parabolæ subtilitate) a primâ infantiâ, in antro aut cavernâ obscurâ et subterraneâ, ad maturam usque ætatem degeret, et tunc derepente in aperta prodiret, et hunc cœli et rerum apparatus contueretur; dubium non est, quin animum ejus subirent et perstringerent quamplurimæ miræ et absurdissimæ phantasiæ. Nos vero scilicet sub aspectu cœli degimus; interea tamen animi in cavernis corporum nostrorum conduntur; ut infinitas errorum et falsitatum imagines haurire necesse sit, si e specu suâ raro tantum et ad breve aliquod tempus prodeant, et non in contemplatione naturæ perpetuo, tanquam sub dio, morentur. Emblematisi quidem illi de specu Platonis optime convenit parabola

illa Heracliti; quod homines scientias in mundis propriis, et non in mundo majore, quærant.

At idola fori<sup>44</sup> molestissima sunt, quæ ex fœdere tacito inter homines de verbis et nominibus impositis, se in intellectum insinuarunt. Verba autem plerunque ex captu vulgi induntur; atque per differentias, quarum vulgus capax est, res secant; cum autem intellectus acutior, aut observatio diligentior res melius distinguere velit, verba obstrepunt. Quod vero hujus remedium est (definitiones scilicet), in plurimis huic malo mederi nequit, quoniam et ipsæ definitiones ex verbis constant, et verba gignant verba. Etsi autem putemus verbis nostris nos imperare, et illud facile dictu sit, loquendum esse ut vulgus, sentiendum ut sapientes; quin etiam vocabula artium (quæ apud peritos solum valent) huic rei satisfacere videri possint; et definitiones (de quibus diximus) artibus præmissæ secundum prudentiam mathematicorum<sup>45</sup> vocabulorum pravas acceptiones corrigere valeant: attamen hæc omnia non sufficiunt, quo minus verborum præstigiae et incantationes plurimis modis seducant, et vim<sup>46</sup> quandam intellectui faciant, et impetum suum (more Tartarorum sagittationis) retro in intellectum (unde profecta sunt) retorqueant. Quare altiore<sup>47</sup> et novo quodam remedio ad hoc malum opus est. Verum hæc jam cursim perstringimus, interim desiderari pronunciantes hanc doctrinam, quam elenchos magnos, sive de idolis animi humani nativis et adventitiis, appellabimus. Ejus autem tractationem legitimam ad Organum Novum referimus.

Superest artis judicandi appendix quædam insignis, quam etiam desiderari statuimus. Siquidem Aristoteles rem notavit, modum rei nullibi persecutus est. Ea tractat, quales demonstrationes ad quales materias, sive subjecta, applicari debeant; ut hæc doctrina tanquam judicationes judicationum contineat. Optime enim Aristoteles neque demonstrationes ab oratoribus, neque suasiones a mathematicis requiri debere

monet. Ut si in probationis genere aberretur, judicatio ipsa non absolvatur. Quando vero sint quatuor demonstrationum genera, vel per consensum immediatum et notiones communes, vel per inductionem, vel per sylogismum, vel per eam (quam recte vocat Aristoteles) demonstrationem in orbem<sup>48</sup> (non a notioribus scilicet, sed tanquam de plano); habent hæ demonstrationes singulæ certa subjecta, et materias scientiarum, in quibus pollent, alia, a quibus excluduntur. Etenim rigor<sup>49</sup> et curiositas in poscendo probationes nimium severas in aliquibus; multo magis facilitas et remissio in acquiescendo probationibus levioribus in aliis; inter ea sunt numeranda, quæ detrimenti plurimum et impediementi scientiis attulerunt. Atque de arte judicandi hæc dicta sint.

*Inductionem  
(Lociis rebus)*

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### CAPUT QUINTUM.

PARTITIO ARTIS RETINENDI SIVE RETENTIVÆ IN DOCTRINAM DE  
ADMINICULIS MEMORIÆ, ET DOCTRINAM DE MEMORIA IPSA.  
PARTITIO DOCTRINÆ DE MEMORIA IPSA, IN PRENOTIONEM ET  
EMBLEMA.

ARTEM retinendi sive custodiendi in duas doctrinas partiemur: doctrinam scilicet de adminiculis memoriæ, et doctrinam de memoriâ ipsâ. Adminiculum memoriæ plane scriptio est: atque omnino monendum quod memoria, sine hoc adminiculo, rebus prolixioribus et accuratioribus impar sit; neque ullo modo, nisi de scripto, recipi debeat. Quod etiam in philosophiâ inductivâ, et interpretatione naturæ, præcipue obtinet: tam enim possit quis calculationes ephemeridis memoriâ nudâ, absque scripto, absolvere, quam interpretationi naturæ, per meditationes et vires memoriæ nativas et nudas, sufficere; nisi eidem memoriæ per tabulas

ordinatas ministretur. Verum missâ interpretatione naturæ, quæ doctrina nova est, etiam ad veteres et populares scientias haud quicquam ferre utilius esse possit, quam memoriæ ad-  
 miniculum solidum et bonum; hoc est, digestum probum et eruditum locorum communium. Neque tamen me fugit, quod relatio eorum, quæ legimus aut discimus, in locos communes<sup>50</sup>, damno eruditionis ab aliquibus imputetur, ut quæ lectionis cursum remoretur, et memoriam ad feriandum invitet. Attamen quoniam adulterina res est in scientiis præcocem esse et promptum, nisi etiam solidus sis et multipliciter instructus; diligentiam et laborem in locis communibus congerendis magni prorsus rem esse usûs et firmitudinis in studiis judicamus; veluti quæ inventioni copiam subministret, et aciem iudicii in unum contrahat. Verum est tamen, inter methodos et syntaxes locorum communium, quas nobis adhuc videre contigit, nullam reperiri, quæ alicujus sit pretii: quandoquidem in titulis suis faciem prorsus exhibeant magis scholæ, quam mundi, vulgares et pædagogicas adhibentes divisiones, non autem eas quæ ad rerum medullas et interiora quovis modo penetrent.

Circa memoriam autem ipsam satis segniter et languide videtur adhuc inquisitum. Extat certe de eâ ars quæpiam<sup>51</sup>; verum nobis constat tum meliora<sup>52</sup> præcepta de memoriâ confirmandâ et ampliandâ haberi posse, quam illa ars complectitur; tum practicam illius ipsius artis meliorem institui posse, quam quæ recepta est. Neque tamen ambigimus (si cui placet hâc arte ad ostentationem abuti) quin possint præstari per eam nonnulla mirabilia et portentosa: sed nihilominus res quasi sterilis est (eo quo adhibetur modo) ad usus humanos. At illud interim ei non imputamus, quod naturalem memoriam destruat et superoneret (ut vulgo objicitur), sed quod non dextere instituta sit ad auxilia memoriæ commodanda in negotiis et rebus seriis. Nos vero hoc habemus (fortasse ex genere vitæ nostro politicae)

anamen to oby

positum accipit  
 in relatione



ut, quæ artem jactant, usum non præbent, parvi faciamus. Nam ingentem numerum nominum aut verborum semel recitatorum eodem ordine statim repetere, aut versus complures de quovis argumento extempore conficere, aut quicquid occurrit satiricâ aliquâ similitudine perstringere, aut seria quæque in jocum vertere, aut contradictione, et cavillatione quidvis eludere, et similia, (quorum in facultatibus animi haud exigua est copia; quæque ingenio et exercitatione ad miraculum usque extolli possunt) hæc certe omnia, et his similia, nos non majoris facimus, quam funambulorum et mimorum agilitates et ludicra: etenim eadem ferme res sunt; cum hæc corporis, illa animi viribus abutantur; et admirationis forsitan aliquid habeant, dignitatis parum.

Ars autem memoriæ duplici nititur intentione, prænotatione et emblemate. Prænotationem vocamus abscissionem quandam investigationis infinitæ. Cum<sup>53</sup> enim quis aliquid revocare in memoriam conatur, si nullam prænotationem habeat, aut perceptionem ejus quod quærit; quærit certe et molitur, et hæc illâc discurrit, tanquam in infinito. Quod si certam aliquam prænotationem habeat, statim abscinditur infinitum, et fit discursus memoriæ magis in vicino, ut venatio damæ intra septa. Itaque et ordo<sup>54</sup> manifesto juvat memoriam. Subest enim prænotio, id quod quæritur, tale esse debere, ut conveniat cum ordine. Similiter carmina facilius discuntur memoriter, quam prosa. Si enim hæretur in aliquo verbo, subest prænotio, tale debere esse verbum, quod conveniat cum versu. Atque ista prænotio est artificialis memoriæ pars prima: nam in artificiali memoriâ locos habemus jam ante digestos et paratos; imagines extempore, prout res postulat, conficimus: at subest prænotio talem esse debere imaginem, qualis aliquatenus conveniat cum loco. Id quod vellicat memoriam, et aliquo modo munit ad rem quam quærimus. Emblema vero deducit intellectuale ad sensibile: sensibile autem semper fortius percutit memoriam,

atque in eâ facilius imprimitur, quam intellectuale. Adeo ut etiam brutorum<sup>55</sup> memoria per sensibile excitetur, per intellectuale minime. Itaque<sup>56</sup> facilius retineas imaginem venatoris leporem persequentis, aut pharmacopœi pyxides ordinantis, aut pedantii orationem habentis, aut pueri versus memoriter recitantis, aut mimi in scenâ agentis; quam ipsas notiones inventionis, dispositionis, elocutionis, memoriæ, actionis. Sunt et alia, quæ pertinent ad memoriâ juvandam (ut modo diximus); sed ars, quæ jam habetur, ex his duobus jam præmissis consistit. Particulares autem artium defectus persequi, fuerit ab instituto nostro recedere. Igitur de arte retinendi sive custodiæ hæc dicta sint<sup>57</sup>. Jam vero ad quartum membrum logicæ, quod traditionem et elocutionem tractat, ordine pervenimus.

DE

## DIGNITATE ET AUGMENTIS SCIENTIARUM.

LIBER SEPTIMUS.

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CAPUT PRIMUM.

PARTITIO ETHICÆ IN DOCTRINAM DE EXEMPLARI, ET GEORGICA ANIMI. PARTITIO EXEMPLARIS (SCILICET BONI) IN BONUM SIMPLEX, ET BONUM COMPARATUM. PARTITIO BONI SIMPLICIS, IN BONUM INDIVIDUALE, ET BONUM COMMUNIONIS.

PERVENTUM est (rex optime) ad ethicam, quæ voluntatem humanam intuetur et tractat. Voluntatem gubernat recta ratio, seducit bonum apparens; voluntatis stimuli affectus, ministri organa et motus voluntarii. De hâc Solomon, "Ante omnia," inquit, "custodi, fili, cor tuum, nam inde procedunt actiones vitæ." In hujus scientiæ pertractatione, qui de eâ scripserunt perinde mihi fecisse videntur, ac si quis, scribendi artem tradere pollicitus, pulchra tantum exhibeat exemplaria literarum tam simplicium quam copularum; de calamo vero ducendo, aut modis characteres efformandi, nihil præcipiat: ita et isti proposuerunt nobis exemplaria bella et luculenta, atque descriptiones sive imagines accuratas boni, virtutis, officiorum, felicitatis, tanquam vera objecta et scopos voluntatis et appetitûs humani: verum quomodo quis possit optime ad hos scopos (excellentes sane, et bene ab illis positos) collimare; hoc est,

quibus rationibus et institutis animus ad illa assequenda subigi et componi possit; aut nihil præcipiunt, aut perfunctorie et minus utiliter. Disseramus, quantum libuerit, virtutes morales in animo humano esse habitualiter, non naturaliter<sup>1</sup>: distinguamus solemniter inter spiritus generosos et vulgus ignobile, quod illi rationum momentis, hi præmio aut pœnâ, ducantur: præcipiamus ingeniose, animum humanum, ut rectificetur<sup>2</sup>, instar bacilli, in contrariam partem inclinationis suæ flecti oportere: aliaque insuper hujusmodi hinc inde spargamus: longe tamen abest, ut hæc, et alia id genus, absentiam rei excusent, quam modo requirimus.

Hujusce neglectûs causam haud aliam esse reor, quam latentem illum scopulum, ad quem tot scientiæ naviculæ impingentes, naufragia passæ sunt: nimirum, quod fastidiant scriptores versari in rebus vulgatis et plebeiis, quæ nec satis subtiles sint ad disputandum, nec satis illustres ad ornandum. Sane haud facile quis verbis assequatur, quantam calamitatem attulerit hoc ipsum, quod dicimus: quod homines ingenitâ superbiâ, et gloriâ vanâ, eas materias tractationum eosque modos tractandi sibi delegerint, quæ ingenia ipsorum potius commendent quam lectorum utilitatibus inserviant. Optime Seneca, "Nocet illis eloquentia, quibus non rerum facit cupiditatem, sed sui:" siquidem scripta talia esse debent, ut amores documentorum ipsorum, non doctorum, excitent. Ii igitur rectâ incedunt viâ, qui de consiliis suis id prædicare possint, quod fecit Demosthenes, atque hâc clausulâ ea concludere, "Quæ si feceritis, non oratorem duntaxat in præsentîâ laudabitis, sed vosmet ipsos etiam, non ita multo post, statu rerum vestrarum meliore." Ego certe (rex optime), ut de meipso, quod res est, loquar, et in iis quæ nunc edo et in iis, quæ in posterum meditor, dignitatem ingenii et nominis mei (si qua sit) sæpius sciens et volens projicio, dum commodis<sup>3</sup> humanis inserviam: quique architectus fortasse in philosophiâ et scientiis esse debeam,

etiam operarius et bajulus, et quidvis demum fio; cum haud pauca, quæ omnino fieri necesse sit, alii autem ob innatam superbiam subterfugiant, ipse sustineam et exequar. Verum (ut ad rem redeamus) quod cœpimus dicere, delegerunt sibi philosophi in ethicâ massam quandam materiæ splendidam et nitentem, in quâ potissimum vel ingenii acumen, vel eloquentiæ vigorem venditare possint: quæ vero practicam maxime instruunt, quandoquidem tam belle ornari non possint, maximâ ex parte omiserunt.

Neque tamen debuerant viri tam eximii desperasse de fortunâ, simili ei, quam poëta Virgilius, et sibi spondere ausus, et revera consequutus est; qui non minorem eloquentiæ, ingenii, et eruditionis, gloriam adeptus est, explicando observationes agriculturæ, quam Æneæ res gestas heroicas enarrando.

“Nec sum animi dubius, verbis ea vincere magnum  
Quam sit, et augustis hunc addere rebus honorem.”

Certe, si serio hominibus cordi sit, non in otio scribere, quæ per otium legantur, sed revera vitam activam instruere et subornare; georgica ista animi humani non minore in pretio apud homines haberi debebant, quam heroicæ illæ effigies virtutis, boni, et felicitatis, in quibus tam operose est insudatum.

Partiemur igitur ethicam in doctrinas principales duas<sup>4</sup>; alteram de exemplari sive imagine boni; alteram de regimine et culturâ animi, quam etiam partem georgica animi appellare consuevimus: illa naturam boni describit, hæc regulas de animo ad illam conformando præscribit.

Doctrina de exemplari (quæ boni naturam intuetur et describit) bonum considerat, aut simplex, aut comparatum; aut genera (inquam) boni, aut gradus. In posteriori horum, disputationes illas infinitas, et speculationes circa boni supremum gradum<sup>5</sup>, quem felicitatem, beatitudinem, summum

bonum vocitarunt (quæ ethnicis instar theologiæ erant) Christiana tandem fides sustulit et missas fecit. Quemmodum enim Aristoteles ait, “Adolescentes posse etiam beatos esse, sed non aliter quam spe<sup>6</sup>,” eodem modo, a Christianâ fide edocti, debemus nos omnes minorum et adolescentum loco statuere, ut non aliam felicitatem cogitemus, quam quæ in spe sita est.

Liberati igitur (bonis avibus) ab hæc doctrinâ, tanquam de cælo ethnicorum (quâ in parte proculdubio elevationem naturæ humanæ attribuerunt majorem, quam cujus illa esset capax; videmus enim quali cothurno Seneca, “Vere magnum, habere fragilitatem hominis, securitatem Dei”), reliqua certe ab illis circa doctrinam exemplaris tradita, minore aut veritatis aut sobrietatis jacturâ, magnâ ex parte recipere possumus. Etenim, quod ad naturam boni positivi et simplicis spectat, illam certe pulcherrime et ad vivum, veluti in tabulis eximiis, depinxerunt; virtutum et officiorum figuras, posituras, genera, affinitates, partes, subjecta, provincias, actiones, dispensationes, diligentissime sub oculos repræsentantes. Neque hic finis: nam hæc omnia animo humano, magno quoque argumentorum acumine et vivacitate, et suasionum dulcedine, commendarunt atque insinuarunt: quinetiam (quantum verbis præstari possit) eadem contra pravos et populares errores et insultus fidelissime muniverunt. Quatenus vero ad naturam boni comparati, huic rei etiam nullo modo defuerunt: in constituendis<sup>7</sup> trinis illis ordinibus bonorum; in collatione vitæ contemplativæ cum activâ; in discriminatione virtutis cum reluctatione, et virtutis jam securitatem<sup>8</sup> nactæ, et confirmatæ; in conflictu et pugná honesti et utilis; in virtutum inter se libramine, nimirum cui quæque præponderet; et similibus. Adeo ut hanc partem de exemplari insigniter excultam jam esse, et antiquos in eâ re mirabiles se viros præstitisse, reperiam: ita tamen, ut philosophos longo post se intervallo reliquerit pia et stre-

nuâ theologorum diligentia, in officiis, et virtutibus morali-  
bus, et casibus<sup>9</sup> conscientiæ, et peccati circumscriptionibus  
pensitandis et determinandis exercitata.

Nihilo secus (ut ad philosophos redeamus) si illi (ante-  
quam ad populares et receptas notiones virtutis, vitii, dolo-  
ris, voluptatis, et cæterorum, se applicassent) supersedissent  
paulisper, et radices ipsas boni et mali, et radicum illarum  
fibras indagassent; ingentem, meo iudicio, lucem illis omni-  
bus, quæ postea in inquisitionem ventura fuissent, affudis-  
sent; ante omnia, si naturam rerum non minus quam  
axiomata<sup>10</sup> moralia consulissent, doctrinas suas minus pro-  
lixas, magis autem profundas reddidissent. Quod cum ab  
illis aut omnino omissum, aut confuse admodum tractatum  
fuerit, nos breviter retractabimus; et fontes ipsos rerum mo-  
ralium aperire et purgare conabimur, antequam ad doctri-  
nam de culturâ animi, quam ponimus ut desideratam, per-  
veniamus. Hoc enim (ut arbitramur) doctrinam de exem-  
plari novis quodammodo viribus donabit.

Inditus est atque impressus unicuique rei appetitus ad  
duplicem naturam, boni; alteram, quâ res totum quiddam  
est in seipsâ; alteram, quâ est pars totius alicujus majoris.  
Atque posterior hæc illâ alterâ dignior est et potentior,  
cum tendat ad conservationem formæ amplioris. Nominetur  
prima bonum individuale, sive suitatis; posterior, bonum  
communione. Ferrum sympathiâ particulari fertur ad mag-  
netem; at si paulo ponderosius fuerit, amores illos deserit,  
et tanquam bonus civis et amator patriæ, terram petit, re-  
gionum scilicet connaturalium suorum. Ulterius paulo per-  
gamus: corpora densa et gravia terram petunt, congregatio-  
nem magnam corporum densorum; attamen, potius quam  
natura rerum divulsionem patiat, et detur (ut loquuntur)  
vacuum, corpora hujusmodi in sursum ferentur, et cessabunt  
ab officio suo erga terram, ut præstent officium suum mundo  
ipsi debitum. Ita quasi perpetuo obtinet, ut conservatio

formæ magis communis minores appetitus in ordinem redigat. At prærogativa ista boni communionis signatur præcipue in homine, si non degeneraverit; juxta memorabile illud Pompeii Magni dictum, qui, quo tempore Romam fames premeret, annonæ importandæ præpositus, vehementissime autem ab amicis interpellatus ne mari, atroce tempestate ingruente, se committeret, illud tantum respondit, "Necesse est ut eam, non ut vivam:" adeo ut vitæ<sup>11</sup> desiderium (quod in inviduo maximum est) amoris et fidei in rempublicam apud eum non præponderaret. Sed quid moramur? Nulla, omnibus seculis, reperta est vel philosophia, vel secta, vel religio, vel lex aut disciplina, quæ in tantum communionis bonum exaltavit, bonum vero individuale depressit quantum sancta fides Christiana: unde<sup>12</sup> liquido pateat, unum eundemque Deum fuisse, qui creaturis leges illas naturæ, hominibus vero legem Christianam dedisset. Propterea legimus, nonnullos ex electis et sanctis viris optasse se potius erasos ex libro vitæ, quam ut salus ad fratres suos non perveniret; ecstasi quâdam charitatis, et impotenti desiderio boni communionis incitatos.

Hoc positum, ita ut immotum maneat et inconcussum, nonnullis ex gravissimis in morali philosophiâ controversiis finem imponit. Primo enim quæstionem illam determinat, de vitâ contemplativâ activæ præferendâ: idque contra sententiam Aristotelis. Omnes siquidem rationes, quæ ab illo pro contemplativâ afferuntur, bonum privatum respiciunt, atque individui tantum ipsius voluptatem, aut dignitatem; quibus in rebus contemplativa palmam haud dubie reportat. Etenim contemplativa non absimilis est comparationi, quâ usus est Pythagoras, ut philosophiæ et contemplationi honorem ac decus assereret, qui ab Hierone, quisnam esset, interrogatus, respondit<sup>13</sup>; Hieronem non latere (si forte unquam Olympicis certaminibus interfuisset) id ibi loci contingere, ut veniant eo alii fortunæ suæ in agonibus periculum facturi;



alii vero ut mercatores, ad merces distrahendas; alii, ut amicos undique confluentes convenirent, et epulis ac hilaritati indulgerent; alii denique, ut cæterorum essent spectatores: se autem unum esse ex illis, qui spectandi gratiâ venerit. Verum<sup>14</sup> homines nosse debent, in hoc humanæ vitæ theatro, Deo et angelis solum convenire, ut spectatores sint. Neque sane fieri potuit, ut hâc de re dubitatio in ecclesiâ unquam suscitaretur (utcumque plurimis in ore fuerit dictum illud, "Pretiosa in oculis Domini mors sanctorum ejus:" ex quo loco mortem illam civilem, et instituta vitæ monasticæ et regularis attollere solebant), nisi illud etiam una subesset, quod vita illa monastica mere contemplativa non sit, verum plane in officiis ecclesiasticis versetur; qualia sunt jugis oratio, et votorum sacrificia Deo oblata; librorum item theologorum, multo in otio, conscriptio, ad legis divinæ doctrinam propagandam: quemadmodum et Moses fecit, cum per tot dies in montis secessu moratus esset. Quinetiam Henoch, ab Adamo septimus, qui videtur fuisse princeps vitæ contemplativæ (etenim "cum Deo ambulasse" perhibetur) nihilominus ecclesiam prophetiæ libro (qui etiam a sancto Juda citatur) dotavit. Contemplativam vero quod attinet meram, et in se ipsâ terminatam, quæque radios nullos, sive caloris sive luminis, in societatem humanam diffundat, nescit eam certe theologia.

Determinat etiam quæstionem, tantâ contentione agitatam, inter scholas Zenonis et Socratis ex unâ parte, qui felicitatem in virtute, aut solâ, aut adornatâ, (cujus semper in officiis vitæ partes potissimæ) collocarunt; et reliquas complures sectas et scholas, ex alterâ parte, veluti scholas Cyrenaicorum<sup>15</sup> et Epicureorum, qui eam in voluptate constituerunt, virtutem autem (sicut fit in comædiis aliquibus, ubi hera cum famulâ vestem mutet) plane ancillam statuerunt, utpote sine quâ voluptati commode ministrari non posset; nec minus illam alteram Epicuri scholam, quasi re-

formatam, quæ felicitatem nihil aliud esse prædicabat, quam animi tranquillitatem et serenitatem, a perturbationibus liberi et vacui; ac si Jovem de solio deturbare vellent, et Saturnum cum aureo seculo reducere, quando neque æstas nec bruma fuissent, non ver, nec autumnus, sed una et æquabilis aeris temperies: denique et illam explosam Pyrrhonis et Herilli scholam, qui sitam autumnaverunt felicitatem in scrupulis quibusque animi prorsus eliminandis, nullam statuentes fixam et constantem boni aut mali naturam, sed actiones pro bonis aut malis habentes, prout ex animo, motu puro et irrefracto, aut contra, cum aversatione et reluctatione, prodirent; quæ tamen opinio in hæresi Anabaptistarum revixit, qui cuncta metiebantur juxta motus et instinctus spiritûs, et constantiam vel vacillationem fidei. Liquet autem ista, quæ recensuimus, omnia ad privatam animorum tranquillitatem et complacentiam, nullo modo autem ad bonum communionis, spectare.

Porro redarguit etiam philosophiam Epicteti, qui hoc utitur præsupposito; felicitatem in iis poni debere, quæ in potestate nostrâ sunt, ne scilicet fortunæ et casibus simus obnoxii: quasi vero non multo fuerit felicius, in rectis et generosis intentionibus, et finibus, qui publicum bonum amplectantur, successu destitui et frustrari, quam in omnibus, quæ ad privatam tantum fortunam nostram referuntur, voti perpetuo compotes fieri. Sicut Consalvus, Neapolim digito militibus indicans, generosâ voce testatus est, multo sibi optatius fore, unum pedem promovendo, ad interitum certum ruere, quam, unius pedis recessu, vitam in multos annos producere. Cui etiam concinit cœlestis dux et imperator, qui pronunciavit "conscientiam bonam juge esse convivium;" quibus verbis aperte significat, mentem bonarum intentionum sibi consciam, utcunque successu careat, verius et purius et naturæ magis consentaneum præbere gaudium, quam universum illum apparatus, quo instrui

possit homo, vel ut desideriiis suis fruatur, vel ut animo conquiescat.

Redarguit itidem philosophiæ abusum illum, circa Epiceteti tempora grassari cœptum: nempe quod philosophia versa fuerit in genus quoddam vitæ professorium et tanquam in artem; quasi scilicet institutum philosophiæ esset, non ut perturbationes compescerentur et extinguerentur, sed ut causæ et occasiones ipsarum evitarentur et summoventur, ideoque particularis quædam vitæ ratio ad hoc obtinendum ineunda esset: introducendo sane tale genus sanitatis in animum, quale fuit Herodici in corpore, cujus meminit Aristoteles; illum scilicet nihil aliud per totam vitam egisse, quam ut valetudinem curaret; et proinde ab infinitis rebus abstineret, corporis interim usu quasi multatus. Ubi si hominibus officia societatis consecrari cordi sit, illa demum valetudo maxime est expetenda, quæ quaslibet mutationes et impetus quoscunque ferre et vincere queat. Eodem modo et animus ille demum vere et proprie sanus et validus censendus est, qui per plurimas et maximas tentationes et perturbationes perrumpere potest. Ita ut optime Diogenes dixisse visus sit; qui eas vires animi laudavit, “quæ non ad caute abstinendum, sed ad fortiter sustinendum valerent;” quæque animi impetum, etiam in maximis præcipitiis, cohibere possint; quæque (id quod in æquis bene subactis laudatur) præsent, ut brevissimo spatio et sistere se, et vertere possint.

Postremo, redarguit idem teneritudinem quandam, et ineptitudinem ad morigerandum, in nonnullis ex antiquissimis philosophis, et maxime in veneratione habitis, notatam: qui<sup>16</sup> nimis facile se a rebus civilibus subduxerint, ut indignitatibus et perturbationibus se exuerent; atque magis, suâ opinione, illibati, et tanquam sacrosancti, viverent: ubi consentaneum esset, constantiam hominis vere moralis talem fore, qualem idem Consalvus in homine militari requirebat;

nimirum ut honor ejus contexeretur tanquam e telâ cras-  
siore; minimeque tam tenui, ut quidvis illud vellicare et  
lacerare possit.

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### CAPUT SECUNDUM.

PARTITIO BONI INDIVIDUALIS, VEL SUITATIS, IN BONUM ACTIVUM,  
ET BONUM PASSIVUM. PARTITIO BONI PASSIVI, IN BONUM CON-  
SERVATIVUM, ET BONUM PERFECTIVUM. PARTITIO BONI COM-  
MUNIONIS, IN OFFICIA GENERALIA, ET RESPECTIVA.

REPETAMUS igitur jam et persequamur primum bonum in-  
dividuale, et suitatis. Illud partiemur in bonum activum,  
et bonum passivum. Etenim hæc quoque differentia boni  
(non absimilis certe illis appellationibus, quæ Romanis in  
œconomicis erant familiares, promi scilicet, et condi) in  
universâ rerum naturâ impressa reperitur: præcipue autem  
se prodit in duplici rerum creaturarum appetitu; altero, se  
conservandi et muniendi; altero se multiplicandi et propa-  
gandi: atque hic posterior, qui activus est, et veluti promus,  
potentior videtur et dignior; ille autem prior, qui passivus  
est, et veluti condus, inferior censi potest. Etenim in  
universitate rerum, natura cœlestis præcipue agens est; at  
natura terrestris, patiens. Etiam in delectationibus animan-  
tium, major voluptas est generandi, quam pascendi. In  
oraculis quoque divinis pronuntiatur, "Beatius esse dare,  
quam accipere." Quin et in vitâ communi, nemo invenitur  
ingenio tam molli et effœminato, quin pluris faciat aliquid,  
quod ei in votis erat, perficere, et ad exitum perducere,  
quam sensualitatem aliquam, aut delectamentum. Atque  
ista quidem boni activi pre-eminentia in immensum exalta-  
tur, ex intuitu conditionis humanæ, quod sit et mortalis, et  
fortunæ icibus exposita. Nam si in voluptatibus hominum  
posset obtineri perpetuitas atque certitudo, magnum pretium

eis accederet, propter securitatem et moram. Quandoquidem autem rem videmus huc recidere: Magni æstimamus mori tardius: et, Ne glories de crastino; nescis partum dici: mirum minime est, si omni contentione feramur ad ea, quæ temporis injurias non reformident. Ea vero nulla esse possunt, præter opera nostra; sicut dicitur, "Opera eorum sequuntur eos." Est et altera præeinentia boni activi haud exigua, indita et sustentata ex eo affectu, qui humanæ naturæ, ut comes individuus, lateri adhæret: amor scilicet novitatis aut varietatis. Ille vero in sensuum voluptatibus (quæ boni passivi pars sunt vel maxima) angustus admodum est, nec latitudinem habet aliquam insignem: "Cogita quamdiu eadem feceris; cibus, somnus, ludus; per hunc circulum curritur. Mori velle, non tantum fortis, aut miser, aut prudens, sed etiam fastidiosus potest." At in actis vitæ nostræ, et institutis, et ambitionibus, insignis est varietas; eaque multâ cum voluptate percipitur, dum inchoamus, progredimur, interquiescimus, regredimur ut vires augeamus, appropinquamus, denique obtinemus, et hujusmodi: ut vere admodum dictum sit, vita sine proposito<sup>17</sup> languida et vaga est. Quod simul et prudentibus et stultissimis competit, ut ait Solomon; "Pro desiderio quærit cerebrosus, omnibus immiscet se." Quinetiam videmus, reges potentissimos, ad quorum nutum, quæcunque sensibus grata sunt, parari possent, nihilominus procurasse sibi interdum desideria humilia et inania (quemadmodum cithara fuit Neroni, gladiatoria Commodo, Antonino aurigatio, et alia aliis) quæ tamen ipsis fuerint omni affluentia voluptatum sensualium potiora. Tanto voluptatem majorem affert, ut aliquid agamus, quam ut fruamur.

Illud interim paulo attentius notandum est, bonum activum, individuale, a bono communionis prorsus differre; quanquam nonnunquam ambo coincidunt. Quamvis enim bonum istud individuale activum, sæpe opera beneficentiæ

(quæ ex virtutibus communionis est) pariat et producat; illud tamen interest, quod illa opera ab hominibus plurimis fiant, non animo alios juvandi aut beandi, sed plane propter se, atque potentiam et amplitudinem propriam. Id quod optime cernitur, quando bonum activum in aliquid impinget, quod sit bono communionis contrarium. Siquidem gigantea illa animi conditio, quâ abripiuntur magni isti orbis terrarum perturbatores (qualis fuit L. Sylla, et plurimi alii, licet in modulo longe minore), qui videntur ad hoc anhelare, ut omnes felices et ærumnosi sint, prout sibi fuerint amici, vel inimici, atque ut mundus tanquam ipsorum præferat imaginem (quæ vera est theomachia); hæc, inquam, ipsa aspirat ad bonum activum individuale, saltem apparens; etsi a bono communionis omnium maxime recedat.

At bonum passivum partiemur in bonum conservativum, et bonum perfectivum. Etenim inditus est unicuique rei triplex appetitus, quatenus ad bonum suitatis, sive individui. Primus, ut se conservet: secundus, ut se perficiat: tertius, ut se multiplicet sive diffundat. Atque hic postremus appetitus ad bonum activum refertur, de quo jam modo diximus. Supersunt igitur reliqua tantum duo, quæ diximus, bona: ex quibus præcellit perfectivum. Minus enim quiddam est, conservare rem in suo statu: majus vero, eandem ad naturam sublimiorem evehere. Reperiuntur siquidem per res universas, naturæ aliquæ nobiliores, ad quarum dignitatem et excellentiam, naturæ inferiores aspirant, veluti ad origines et fontes suos. Sic de hominibus non male cecinit ille:

“Igneus est ollis vigor, et cælestis origo.”

Homini enim, assumptio aut approximatio ad divinam aut angelicam naturam, est formæ suæ perfectio. Cujus quidem boni perfectivi prava et præpostera imitatio, pestis est ipsa vitæ humanæ, et turbo quidam rapidus, qui omnia abripit et

subvertit. Nimirum, dum homines, exaltationis vice formalis atque essentialis, cæcâ ambitione advolant ad exaltationem tantummodo localem. Quemadmodum enim ægri, remedium mali sui non inventientes, de loco in locum corpus agitant et volvunt; quasi ex mutatione loci a seipsis abscedere, et internum malum effugere possint: eodem modo evenit in ambitione, ut homines, simulachro quodam falso naturæ suæ exaltandæ abrepti, nihil aliud adipiscantur, quam loci quandam celsitudinem et fastigium.

Bonum vero conservativum nihil aliud est, quam receptio et fruitio rerum naturæ nostræ congruentium. Hoc vero bonum, licet maxime sit simplex et nativum, tamen ex bonis videtur mollissimum atque infimum. Quin et hoc ipsum bonum recipit differentiam nonnullam; circa quam partim vacillavit iudicium hominum, partim ommissa est inquisitio. Boni siquidem fruitionis, sive, quod vulgo dicitur, jucundi dignitas et commendatio, aut in sinceritate fruitionis sita est, aut in ejusdem vigore: quorum alterum inducit et præstat æqualitas; alterum autem varietas et vicissitudo: alterum minorem habet mixturam mali, alterum impressionem magis fortem et vividam boni. Cæterum, horum utrum melius, ambigitur: dein, num natura humana utrumque simul apud se retinere possit, non inquiritur.

Atque quantum ad id, de quo ambigitur, ventilari cœpit illa controversia inter Socratem et sophistam quendam. Ac Socrates quidem asserebat<sup>18</sup> felicitatem sitam esse in animi pace constante, et tranquillitate: sophista vero in hoc, ut quis multum appetat, et multum fruatur. Quin et ab argumentis delapsi sunt ad convicia; dicente sophistâ, felicitatem Socratis, stipitis vel lapidis esse felicitatem; e contra Socrate, sophistæ felicitatem, felicitatem esse scabiosi, qui perpetuo pruriret et scalperet. Neque tamen desunt utrique sententiæ sua firmamenta. Nam Socrati assentitur vel Epicuri schola ipsa, quæ virtutis, ad felicitatem, partes esse maximas, non

diffitebatur. Quod si ita sit, certo certius est, virtutis majorem esse usum in perturbationibus sedandis, quam rebus cupitis adipiscendis. Sophistæ autem nonnihil suffragari videtur assertio illa, cujus a nobis mentio modo facta est, quod videlicet bonum perfectivum bono conservativo sit superius; quippe quia cupitarum rerum adeptiones naturam videantur sensim perficere: quod licet vere non faciant, tamen et motus ipse in circulo, speciem nonnullam præ se fert motûs progressivi.

At secunda quæstio (num scilicet natura humana non possit et animi tranquillitatem, et fruendi vigorem, simul retinere) rite definita, prioram illam reddit otiosam et supervacaneam. Annon enim videmus, haud raro animos nonnullorum ita factos et compositos, ut voluptatibus afficiantur vel maxime cum adsint, et tamen earum jacturam non gravate ferant? Ita ut series illa philosophica, "Non uti, ut non appetas; non appetere, ut non metuas," videatur esse pusilli cujusdam animi, et diffidentis. Sane, doctrinæ pleræque philosophorum videntur esse paulo timidiore, et cavere hominibus plusquam natura rerum postulat. Veluti cum mortis formidinem medendo augent. Etenim, cum nihil aliud fere vitam humanam faciant, quam mortis quandam præparationem et disciplinam, quomodo fieri possit, ut ille hostis mirum in modum non videatur terribilis, contra quem muniendi nullus sit finis<sup>19</sup>? Melius poëta (ut inter ethnicos)

"Qui finem vitæ extremum inter munera ponat  
Naturæ."

Similiter et in omnibus annisi sunt philosophi animum humanum reddere nimis uniformem et harmonicum: eum motibus contrariis et extremis minime assuefaciendo. Cujus causam arbitror fuisse, quod ipsi vitæ se privatæ dedicarunt, a negotiis et aliorum obsequiis immuni et liberæ. Quin



potius imitentur homines prudentiam gemmariorum; qui, si forte in gemmâ inveniatur nubecula aliqua, aut glaciecula, quæ ita possit eximi, ut magnitudini lapidis non nimium detrahatur, eam tollunt; aliter vero intactam eam relinquunt: pari ratione, serenitati animorum ita consulendum est, ut non destruat magnanimitas. Atque de bono individuali hactenus.

Postquam igitur de bono suitatis (quod etiam particulare, privatum, individuale, appellare solemus) jam dixerimus; repetamus bonum communionis, quod societatem intuetur. Istud nomine officii vocari consuevit: siquidem vocabulum<sup>20</sup> *officii* magis proprie attribuitur animo bene disposito erga alios: vocabulum *virtutis* animo intra se recte formato et composito. Verum ista pars, primo intuitu, scientiæ civili deberi videtur: attamen, si diligentius attendas, non ita: siquidem tractat regimen et imperium uniuscujusque in seipsum, neutiquam vero in alios. Atque sicut in architecturâ, alia res est, postes, trabes, et cæteras ædificii partes efformare, et ad ædificandi usum præparare; alia autem, easdem ad invicem aptare et compaginare: sicut etiam in mechanicis, instrumentum aut machinam fabricare et conficere, non idem est, quod fabricatum erigere, movere, et in opere ponere: sic doctrina de conjugatione ipsâ hominum in civitate, sive societate, differt ab eâ, quæ eos reddit ad hujusmodi societatis commoda conformes et bene affectos.

Ista pars de officiis, etiam in duas portiones tribuitur: quarum altera tractat de officio hominis in communi: altera de officiis specialibus et respectivis, pro singulorum professione, vocatione, statu, personâ, et gradu. Harum primam, satis excultam, diligenterque a veteribus et aliis explicatam, jam antea retulimus; alteram quoque, sparsim quidem tractatam, licet non in corpus aliquod integrum scientiæ digestam, reperimus. Neque tamen hoc ipsum, quod sparsim tractetur, reprehendimus; quinimo de hoc argumento per

partes scribi longe consultius existimamus. Quis enim tantâ fuerit vel perspicaciâ vel confidentiâ, ut de officiis peculiari-  
bus et relativis, singulorum ordinum et conditionum, perite et ad vivum disceptare, et definire possit, aut sustineat? Tractatus autem, qui experientiam<sup>21</sup> non sapiunt, sed ex notitiâ rerum generali et scholasticâ tantummodo deprompti sunt, de rebus hujusmodi, inanes plerunque evadunt et inutiles. Quamvis enim aliquando contingat, spectatorem ea animadvertere, quæ lusorem fugiant; atque jactetur proverbium quoddam magis audaculum, quam sanum, de censurâ vulgi circa actiones principum, “stantem in valle optime perlustrare montem;” optandum tamen imprimis esset, ut non nisi expertissimus et versatissimus quisque se hujusmodi argumentis immisceret. Hominum enim speculativorum, in materiis activis, lucubrationes, iis, qui in agendo fuerint exercitati, nihilo meliores videntur, quam dissertationes Phormionis de bellis æstimatæ sunt ab Hannibale, qui eas habuit pro somniis et deliriis. Unum<sup>22</sup> duntaxat vitium illos occupat, qui de rebus ad suum munus aut artem pertinentibus libros conscribunt; quod scilicet in illis Sparti suis ornandis atque attollendis modum tenere nesciant.

In hoc genere librorum, piaculum foret, non meminisse (honoris causâ) excellentissimi illius operis, a majestate tuâ elucubrati, “De officio regis.” Scriptum enim hoc plurimos intra se cumulavit ac recondidit thesauros, tam conspicuos quam occultos, theologiæ, ethicæ, et politicæ; insigni cum aspersione aliarum artium: estque, meo judicio, inter scripta, quæ mihi perlegere contigerit, præcipue sanum et solidum. Non illud ullo loco, aut inventionis fervore æstuat, aut indiligentiæ frigore torpet aut dormitat; non vertigine aliquando corripitur, unde in ordine suo servando confundatur aut excidat; non digressionibus distrahitur, ut illa, quæ nihil ad rhombum sunt, expatiatione

aliquâ flexuosâ complectatur; non odoramentorum aut pigmentorum fucis adulteratur, qualibus illi utuntur, qui lectorum potius delectationi, quam argumenti naturæ inserviunt: ante omnia vero, spiritu valet istud opus non minus quam corpore, utpote quod et cum veritate optime consentiat, et ad usum sit accommodatissimum. Quinetiam vitio illo, de quo paulo ante diximus (quod, si in alio quopiam, in rege certe, et scripto de majestate regiâ, tolerandum fuerit) omnino caret, nempe quod culmen et fastigium regium non immodice aut invidiose extollat; siquidem majestas tua regem non depinxit aliquem Assyriæ aut Persiæ, gloriâ et externo fastu nitentem et coruscantem, sed vere Mosem, aut Davidem, pastores scilicet populi sui. Neque vero mihi unquam memoriâ excidet dictum quoddam vere regium, quod in lite gravissimâ terminandâ majestas tua, pro sacro illo, quo præditus es, spiritu ad populos regendos, pronunciavit; nimirum, “Reges juxta leges regnorum suorum gubernacula tractare, quemadmodum et Deus juxta leges naturæ; et æque raro prærogativam illam suam, quæ leges transcendit, ab illis usurpandam, ac a Deo videmus usurpari potestatem miracula patrandi.” Nihilo tamen secius, ex libro illo altero, a majestate tuâ conscripto, “De liberâ monarchiâ,” satis omnibus innotescit, non minus majestati tuæ cognitam esse et perspectam plenitudinem potestatis regiæ, atque ultimitates (ut scholastici loquuntur) jurium regalium, quam officii et muneris regii limites et cancellos. Non dubitavi igitur in medium adducere librum illum, a majestatis tuæ calamo exaratum, tanquam exemplum primum et maxime illustre tractatum de peculiaribus et respectivis officiis. Quo de libro, quæ a me jam dicta sunt, dixissem profecto, si ante annos mille a rege quopiam conscriptus fuisset. Neque vero me movet decorum illud, quod vulgo præscribitur, ne quis coram laudetur; modo laudes illæ nec modum excedant, nec intempestive, aut nullâ

datâ occasione, tribuantur. Cicero certe, in luculentissimâ illâ oratione suâ pro M. Marcello, nihil aliud agit, quam ut exhibeat tabulam quandam, singulari artificio depictam, de laudibus Cæsaris, licet coram ipso oratio illa haberetur. Quod et Plinius secundus fecit erga Trajanum. Itaque jam ad propositum revertamur.

Pertinet porro ad hanc partem de officiis respectivis vocationum et professionum singularum, doctrina alia, tanquam priori relativa sive opposita; nimirum de fraudibus, cautelis, imposturis, et vitiis ipsarum: siquidem depravationes et vitia officiis et virtutibus opponuntur. Neque omnino de his, in plurimus scriptis et tractatibus, siletur; sed sæpe ad illa notanda saltem obiter excurritur. At quo tandem modo? Per satiram scilicet, et cynice (more Luciani), potius quam serio et graviter. Etenim plus operæ impenditur, ut pleraque in artibus, etiam utilia et sana, maligno dente vellicentur, et ad ludibrium hominibus exponantur, quam ut quæ in iisdem corrupta sunt et vitiosa, secernantur a salubribus et incorruptis. At optime Solomon: “quærenti derisori scientiam, ipsa se abscondit, sed studioso fit obviam.” Quicumque enim ad scientiam accedat animo irridendi et aspernandi, inveniet proculdubio quæ cavillettur plurima, ex quibus vero doctior fiat, perpauca. Verum tractatio hujus, de quo loquimur, argumenti, gravis et prudens, atque cum integritate quâdam et sinceritate conjuncta, inter munitissima virtutis ac probitatis propugnacula videtur numeranda. Nam sicut fabulose perhibetur de basilisco, si primus quempiam conspexerit, illico hominem perimit; si quis illum prior, basiliscus perit: pari ratione, fraudes, imposturæ, et malæ artes, si quis eas prior detexerit, nocendi facultate privantur; quod si illæ prævenerint, tum vero, non alias, periculum creant. Est<sup>23</sup> itaque quod gratias agamus Machiavello, et hujusmodi scriptoribus, qui aperte et indisimulanter proferunt, quid homines facere soleant, non quid

debeant. Fieri enim nullo modo potest, ut jungatur serpentina illa prudentia cum innocentia columbinâ, nisi quis mali ipsius naturam penitus pernoscat. Absque hoc enim deerunt virtuti sua præsidia et munimenta. Imo neque ullo modo possit vir bonus et probus malos et improbos corrigere et emendare, nisi ipse prius omnia malitiæ latibula et profunda exploraverit. Etenim qui iudicio plane corrupto sunt et depravato, hoc habent, ut præsupponant honestatem in hominibus ab inscitia et simplicitate quâdam morum oriri; atque ab eo tantum, quod fides habeatur concionatoribus et pædagogis, item libris, præceptis moralibus, et iis, qui vulgo prædicantur et decantantur, sermonibus: adeo ut, nisi plane perspiciant, opiniones suas pravas, ac corrupta et detorta principia, non minus illis, qui hortantur et admonent, quam sibi ipsis, esse explorata et cognita, probitatem omnem morum et consiliorum aspernentur; juxta oraculum illud Solomonis mirabile; “Non recipit stultus verba prudentiæ, nisi ea dixeris, quæ versantur in corde ejus.”<sup>24</sup> Hanc autem partem, de cautelis, et vitiis respectivis, inter desiderata numeramus: eamque nomine satiræ seriæ, sive tractatûs de interioribus rerum, appellabimus.

Etiam ad doctrinam de officiis respectivis pertinent officia mutua, inter maritum et uxorem, parentes et liberos, dominum et servum; similiter leges amicitiae, et gratitudinis; nec non civiles obligationes fraternitatum, collegiorum; etiam vicinitatis, ac similibus: verum intelligatur hoc semper, illa istis tractari, non quatenus sunt partes societatis civilis (id enim ad politicam refertur), sed quatenus animi singulorum, ad illa societatis vincula tuenda, instrui et prædisponi debeant.

At doctrina de bono communionis (quemadmodum et illa de individuali) bonum tractat, non tantum simpliciter, sed et comparate: quo spectat officia perpendere, inter hominem et hominem; inter casum et casum; inter privata et pub-

lica; inter tempus præsens et futurum: sicut videre est in animadversione illâ severâ et atroci L. Bruti contra filios suos illam a plerisque in cœlum laudibus efferi; at alius quispiam dixit,

“ Infelix, utcunque ferent ea fata minores.”

Id ipsum licet intueri in cœnâ illâ, ad quam invitati sunt M. Brutus, C. Cassius, et alii. Illic enim, cum ad animos explorandos circa conspersionem in caput Cæsaris intentam, quæstio astute mota esset, Num licitum foret tyrannum occidere? ibant convivæ in opiniones diversas; dum alii dicerent, plane licere, quod servitus ultimum esset malorum; alii minime, quod tyrannus minus exitialis esset, quam bellum civile. Tertium autem genus, veluti ex scholâ Epicuri, asserebat, indignum esse prudentes periclitari pro stultis. Verum plurimi sunt casus de officiis comparatis; inter quos frequenter ille intervenit, Utrum a justitiâ deflectendum sit, propter salutem patriæ, aut hujusmodi aliquod insigne bonum in futuro? Circa quem Jason Thessalus dicere solebat: Aliqua sunt injuste facienda, ut multa juste fieri possint. Verum replicatio in promptu est: Auctorem præsentis justitiæ habes; sponsorem futuræ non habes. Sequantur homines, quæ in præsentia bona et justa sunt, futura divinæ providentiæ remittentes. Atque circa doctrinam de exemplari, sive de bono, hæc dicta sint.

### CAPUT TERTIUM.

PARTITIO DOCTRINÆ DE CULTURA ANIMI IN DOCTRINAM DE CHARACTERIBUS ANIMORUM; DE AFFECTIBUS; ET DE REMEDIIS, SIVE CURATIONIBUS. APPENDIX DOCTRINÆ EJUSDEM DE CONGRUITATE INTER BONUM ANIMI ET BONUM CORPORIS.

Nunc igitur, postquam de fructu vitæ (sensu intelligimus philosophico) verba fecerimus, superest, ut de culturâ animi,

quæ ei debetur, dicamus: sine quâ pars prior nihil aliud videtur, quam imago quædam, aut statua, pulchra quidem aspectu, sed motu et vitâ destituta. Cui sententiæ Aristoteles ipse disertis verbis suffragatur: "Necesse est igitur de virtute dicere, et quid sit, et ex quibus gignatur. Inutile enim fere fuerit, virtutem quidem nosse, acquirendæ autem ejus modos et vias ignorare. Non enim de virtute tantum, quâ specie sit, quærendum est, sed et quomodo sui copiam faciat; utrumque enim volumus, et rem ipsam nosse, et ejus compotes fieri; hoc autem ex voto non succedet, nisi sciamus, et ex quibus, et quo modo." Verbis adeo expressis, atque etiam iterato, hanc partem inculcat; quam tamen ipse non persequitur. Hoc similiter illud est, quod Cicero Catoni juniori, veluti laudem non vulgarem, attribuit; quod scilicet philosophiam amplexus esset, non disputandi causâ, ut magna pars, sed ita vivendi. Quamvis autem, pro temporum, in quibus vivimus, socordiâ, paucis curæ sit, ut animum sedulo colant et componant, et vitæ rationem ad normam aliquam instituant (secundum illud Senecæ, "De partibus vitæ quisque deliberat; de summâ nemo:" adeo ut hæc pars censi possit supervacua) illud tamen minime nos movet, ut eam intactam relinquamus, quin potius cum illo Hippocratis aphorismo concludimus; "Qui gravi morbo correpti, dolores non sentiunt, iis mens ægrotat." Medicinâ illis hominibus opus est, non solum ad curandum morbum, sed ad sensum expergefaciendum. Quod si quis objiciat, animorum curationem theologiæ sacræ munus esse, verissimum est quod asserit; attamen philosophiam moralem in famulitium theologiæ recipi, instar ancillæ prudentis, et pedissequæ fidelis, quæ ad omnes ejus nutus præsto sit, et ministret, quid prohibeat? etenim quemadmodum in Psalmo habetur, quod "Oculi ancillæ perpetuo ad manus dominæ respiciunt;" cum tamen minime dubium sit, quin haud pauca ancillæ judicio et curæ relinquuntur; eodem modo et ethica

obsequium theologiæ omnino præstare debet, ejusque præceptis morigera esse; ita tamen ut et ipsa, intra suos limites, haud pauca sana et utilia documenta continere possit.

Hanc igitur partem (quando præstantiam ejus in animo recole) in corpus doctrinæ nondum redactam, non possum non vehementer mirari. Eam igitur, ex more nostro, cum inter desiderata collocemus, aliquâ ex parte adumbrabimus.

Ante omnia igitur in hâc re (sicut et universis, quæ spectant ad practicam) ratio nobis est subducenda, quid in nostrâ sit potestate, quid non. In altero enim datur alteratio, in altero vero applicatio tantum. Agricola nullum est imperium, aut in naturam soli, aut in aëris temperies; itidem nec medico, aut in crasin et constitutionem naturalem ægri, aut in accidentium varietatem. At in culturâ animi, et morbis ejus persanandis, tria in considerationem veniunt; characteres diversi dispositionum, affectus, et remedia: quemadmodum et in corporibus medicandis proponuntur illa tria: complexio sive constitutio ægri, morbus, et curatio. Ex illis autem tribus, postremum tantum in nostrâ potestate situm est; priora duo non item. Verum et in illis ipsis quæ in potestate nostrâ non sunt, non minus diligens facienda est inquisitio, quam in illis quæ potestati nostræ subjiuntur. Etenim illorum perspicax et accurata cognitio substernenda est doctrinæ de remediis, ut eadem commodius et feliciter applicentur. Neque enim vestis corpori aptari possit, nisi mensura corporis ante excipiatur.

Primus igitur articulus doctrinæ de culturâ animi versabitur circa diversos characteres ingeniorum sive dispositionum. Neque tamen loquimur de vulgatis illis propensionibus in virtutes et vitia; aut etiam in perturbationes et affectus: sed de magis intrinsicis et radicalibus. Sane subiit animum, etiam in hâc parte, nonnunquam admiratio, quod a scriptoribus, tam ethicis, quam politicis, ut plurimum neglecta aut prætermissa sit; cum utrique scientiæ clarissimum lumen



jubar affundere possit. In traditionibus astrologiæ non inscite omnino distincta sunt ingenia et dispositiones hominum, ex prædominantiis planetarum; quod alii a naturâ facti sint ad contemplationes; alii ad res civiles; alii ad militiam; alii ad ambitum; alii ad amores; alii ad artes; alii ad genus vitæ varium. Item apud poetas (heroicos, satiricos, tragicos, comicos) sparguntur ubique simulacra ingeniorum, licet fere cum excessu, et præter modum veritatis. Quin et hoc ipsum argumentum de diversis characteribus ingeniorum, est ex iis rebus, in quibus sermones hominum communes (quod valde raro, interdum tamen, contingit) libris ipsis sunt prudentiores. At longe optima hujus tractatûs supellex et sylva peti debet ab historicis prudentioribus; neque tamen ab elogiis tantum, quæ sub obitum personæ alicujus illustris subnectere solent, sed multo magis ex corpore integro historiæ, quoties hujusmodi persona veluti scenam conscendat. Illa enim intertextata imago, potior videtur descriptio, quam elogiis censura: qualis habetur apud T. Livium, Africanum et Catonis majoris; apud Tacitum, Tiberii, Claudii, et Neronis; apud Herodianum, Septimii Severi; apud Philippum Comineum, Ludovici undecimi Gallorum regis; apud Franciscum Guicciardinum, Ferdinandi Hispani, Maximiliani Cæsaris, et Leonis et Clementis, pontificum. Isti enim scriptores, harum personarum, quas sibi depingendas delegerunt, effigies quasi perpetuo intuentes, nunquam fere rerum gestarum ab ipsis mentionem faciunt, quin et aliquid insuper de naturâ ipsorum inspergant. Etiam nonnullæ, in quas incidimus, relationes de conclavibus pontificum, characteres de moribus cardinalium bonos exhibuerunt: sicut et literæ legatorum, de consiliariis principum. Fiat itaque ex câ, quam diximus, materiâ (quæ certe fertilis est et copiosa) tractatus diligens et plenus. Neque vero volumus, ut characteres isti in ethicis (ut fit apud historicos, et poetas, et in sermonibus communibus) excipiantur, tanquam imagines civiles inte-

græ; sed potius ut imaginum ipsarum lineæ et ductus magis simplices, quæ inter se compositæ et commixtæ quascunque effigies constituunt; quot et quales eæ sunt, et quomodo inter se connexæ et subordinatæ: ut fiat tanquam artificiosa et accurata ingeniorum et animorum dissectio, atque ut dispositionum, in hominibus individuis, secreta prodantur, atque ex eorum notitiâ, curationum animi præcepta rectius instituantur.

Neque vero characteres ingeniorum, ex naturâ impressi, recipi tantum in hunc tractatum debent; sed et illi, qui alias animo imponuntur, et sexu, ætate, patriâ, valetudine, formâ, et similibus: atque insuper illi, qui ex fortunâ, veluti principum, nobilium, ignobilium, divitum, pauperum, magistratum, idiotarum, felicitum, ærumnosorum, et hujusmodi. Videmus enim Plautum miraculi loco habere, quod senex quis sit beneficus; “benignitas hujus, ut adolescentuli est.” D. autem Paulus severitatem disciplinæ erga Cretenses præcipiens (“increpa eos dure”), ingenium gentis ex poetâ accusat, “Cretenses semper mendaces, malæ bestię, ventres pigri.” Sallustius id in regum ingeniis notat, quod apud eos frequens sit contradictoria appetere: “Plerunque regiæ voluntates, ut vehementes sunt, sic mobiles, sæpeque ipsæ sibi adversæ.” Tacitus observat, honores et dignitates ingenia hominum in deterius sæpius flectere, quam in melius; “solus Vespasianus mutatus est in melius.” Pindarus illud animadvertit, fortunam subitam et indulgentem animos plerunque enervare et solvere; “sunt qui magnam felicitatem concoquere non possunt.” Psalmus innuit facilius esse modum adhibere et temperamentum in fortunæ statu, quam in incremento: “Divitiæ si affluant, nolite cor apponere.” De similibus quibusdam observationibus ab Aristotele in Rhetoricis mentionem obiter factam non inficior, nec non in aliorum scriptis nonnullis sparsim: verum nunquam adhuc incorporatæ fuerunt in moralem philoso-

phiam, ad quam principaliter pertinent, non minus certe quam ad agriculturam, tractatus de diversitate soli et glebæ, aut ad medicinam, tractatus de complexionibus aut habitibus corporum diversis. Id autem nunc tandem fieri oportet, nisi forte imitari velimus temeritatem empiricorum, qui iisdem utuntur medicamentis ad ægrotos omnes, cujuscunque sint constitutionis.

Sequitur doctrinam de characteribus doctrina de affectibus et perturbationibus<sup>25</sup>, qui loco morborum animi sunt, ut jam dictum est. Quemadmodum enim politici prisci de democratiis dicere solebant, quod populus esset mari ipsi similis, oratores autem ventis; quia, sicut mare per se placidum foret et tranquillum, nisi a ventis agigaretur et turbaretur, sic et populus esset naturâ suâ pacatus et tractabilis, nisi a seditiosis oratoribus impelleretur et incitaretur: similiter vere affirmari possit, naturam mentis humanæ sedatam fore, et sibi constantem, si affectus, tanquam venti, non tumultuarentur, ac omnia miscerent. Et hic rursus subit nova admiratio, Aristotelem, qui tot libros de ethicis conscripsit, affectus, ut membrum ethicæ principale, in illis non tractasse; in rhetoricis autem, ubi tractandi interveniunt secundario (quatenus scilicet oratione cieri aut commoveri possint), locum illis reperissè (in quo tamen loco de iis, quantum tam paucis fieri potuit, acute et bene disseruit): nam disceptationes ejus de voluptate et dolore huic tractatui nullo modo satisfaciunt; non magis, quam qui de luce et lumine tantum scriberet, de particularium colorum naturâ scripsisse diceretur; siquidem voluptas et dolor erga affectus particulares ita se habent, ut lux erga colores. Meliorem certe in hoc argumento (quatenus ex his, quæ nunc extant, conjicere liceat) diligentiam adhibuerunt Stoici<sup>26</sup>; attamen talem, quæ potius in definitionum subtilitate, quam in tractatu aliquo pleno et fuso, consisteret. Equidem reperio etiam libellos quosdam elegantes, de nonnullis ex affectibus,

veluti de irâ, de inutili verecundiâ, et aliis perpaucis. Sed si verum omnino dicendum sit, doctores hujus scientiæ præcipui sunt poëtæ et historici, in quibus ad vivum depingi et dissecari solet, quomodo affectus excitandi sunt et accendendi? quomodo leniendi et sopiendi? quomodo rursus continendi ac refrænandi, ne in actus erumpant? quomodo itidem se licet compressi et occultati, prodant; quas operationes edant? quas vices subeant? qualiter sibi mutuo implicentur? qualiter inter se digladiantur et opponantur? et innumera hujus generis. Inter quæ hoc ultimum plurimi est usûs in moralibus et civilibus; qualiter (inquam) affectus affectum in ordinem cogat; et alterius auxilio, ad alterum subjugandum, uti liceat? Venatorum et aucupum more, qui bestiæ operâ ad bestias, volucris alicujus ad volucres capiendas utuntur: quod fortasse aliter ex sese, absque brutorum auxilio, homo tam facile præstare non possit. Quin et hoc fundamento nititur excellens ille, et per omnia patens, usus in civilibus præmii et pœnæ; quæ rerumpublicarum columen sunt; cum affectus illi prædominantes formidinis et spei, alios omnes affectus noxios coërceant et supprimant. Etiam sicut in regimine statûs, non raro fit ut factio factione in officio contineatur; similiter fit et in regimine mentis interno.

Pervenimus nunc ad illa, quæ in nostrâ sunt potestate, quæque opeantur in animum, voluntatemque et appetitum efficiunt et circumagunt; ideoque ad immutandos mores plurimum valent. Quâ in parte dubuerant philosophi strenue et gnaviter, inquirere, De viribus<sup>27</sup> et energiâ consuetudinis, exercitationis, habitûs, educationis, imitationis<sup>28</sup>, æmulationis, convictûs, amicitiae, laudis, reprehensionis, exhortationis, famæ, legum, librorum, studiorum, et si quæ sunt alia<sup>29</sup>. Hæc enim sunt illa, quæ regnant in moralibus; ab istis, agentibus animus patitur et disponitur; ab istis veluti ingredientibus, conficiuntur pharmaca, quæ ad con-

servandam et recuperandam animi sanitatem conducant, quatenus remediis humanis id præstari possit. Ex quorum numero unum aut alterum seligemus, in quibus paululum immorabimur, ut reliquis sint exemplo. De consuetudine igitur et habitu, pauca delibabimus.

Opinio illa Aristotelis<sup>30</sup> plane mihi videtur angustias quasdam contemplationis et negligentiam sapere, cum asserit in illas actiones, quæ naturales sunt, consuetudinem nihil posse; exemplo usus, quod si lapis millies projiciatur in altum, ne inclinationem quidem sponte ascendendi acquirit; quinetiam quod sæpius videndo<sup>31</sup>, aut audiendo, nihilo melius aut videmus, aut audimus. Quamvis enim hoc teneat in aliquibus, ubi natura est peremptoria (cujus rei causas reddere in præsentia non vacat), aliter tamen in illis fit, in quibus natura, secundum latitudinem quandam, patitur intentionem et remissionem. Sane videre potuit, chirothecam paulo arctiorem, manui sæpius inducendo, laxiorem reddi; baculum usu et morâ in contrarium flexûs sui naturalis incurvari, et in eodem statu paulo post durare; vocem exercitando magis fieri robustam et sonoram; frigora æstumque consuetudine tolerari; et ejusdem generis complura. Quæ quidem posteriora duo exempla propius accedunt ad rem, quam quæ ab ipso adducta sunt. Attamen, utcunque hoc se habeat, quo magis verum fuerit, tam virtutes, quam vitia, in habitu<sup>32</sup> consistere; eo magis ei contendendum fuerat, ut normas præscriberet, quomodo hujusmodi habitus fuerint acquirendi aut amovendi: plurima siquidem confici possint præcepta de prudenti institutione exercitationum animi, non minus quam corporis. Illorum paucula recensebimus.

Primum<sup>33</sup> erit, ut jam a principio caveamus a pensis, vel magis arduis, vel magis pusillis, quam res postulat: nam si oneris nimium imponatur, apud ingenium mediocre bene sperandi alacritatem obtundes; apud ingenium fiducia ple-

num opinionem concitabis, quâ plus sibi polliceatur, quam præstare possit; quod secum trahit socordiam. In utroque autem ingenii temperamento fiet ut experimentum expectationi non satisfaciat; id quod animum semper dejicit, et confundit. Quod si pensa leviora fuerint, magna inducitur, in progressionis summâ, jactura.

Secundum erit, ut ad excercendam facultatem aliquam, quo habitus comparetur, duo imprimis tempora observentur; alterum, quando animus optime fuerit ad rem dispositus, alterum quando pessime; ut ex priore plurimum in via promoveamus, ex posteriore nodos obicesque animi contentione strenuâ deteramus, unde tempora media facile et placide labentur.

Tertium erit illud præceptum, cujus Aristoteles obiter meminit; "Ut totis viribus" (citra tamen vitium) "nitamur in contrarium illius, ad quod naturâ maxime impellimur:" sicut cum in adversum gurgitis remigamus; aut baculum incurvum, ut rectum fiat, in contrarium flectimus.

Quartum præceptum ex illo axiomate pendet, quod verissimum est; animum ad quæcunque feliciter trahi et suavius, si illud, quo tendimus, in intentione operantis non sit principale, sed, tanquam aliud agendo, superetur; quoniam ita fert natura, ut necessitatem et imperium durum ferme oderit. Sunt et alia multa quæ utiliter præcipi possint de regimine consuetudinis; consuetudo<sup>34</sup> enim, si prudenter et perite inducatur, fit revera (ut vulgo dicitur) altera natura; quod si imperite et fortuito administretur, erit tanquam simia naturæ, quæ nihil ad vivum imitetur, sed inscite tantum et deformiter.

Similiter si de libris, et studiis, eorumque ad mores virtute et influentiâ, verba facere vellemus; numnam desunt plurima præcepta et consilia fructuosa, eo spectantia? Annon unus ex patribus, magnâ cum indignatione, poësim appellavit "vinum dæmonum;" cum revera progignat plu-

rimas tentationes, cupiditates, et opiniones vanas? Annon prudens admodum, et digna quæ bene perpendatur, est sententia Aristotelis, "Juvenes non esse idoneos moralis philosophiæ auditores:" quia in illis perturbationum æstuatio nondum sedata est, nec tempore et rerum experientiâ consopita? Atque, ut verum dicamus, annon ideo fit, ut scriptorum priscorum præstantissimi libri et sermones (quibus ad virtutem homines efficacissime invitati sunt, tam augustam ejus majestatem omnium oculis repræsentando, quam opiniones populares in virtutis ignominiam, tanquam habitu parasitorum indutas, derisui propinando) tam parum prosint ad vitæ honestatem, et mores pravos corrigendos, quia perlegi et revolvi non consueverunt a viris ætate et judicio maturis, sed pueris tantum et tironibus relinquuntur? Annon et hoc verum est, juvenes multo minus politicæ quam ethicæ auditores idoneos esse, antequam religione et doctrinâ de moribus et officiis plane imbuantur; ne forte, judicio depravati et corrupti, in eam opinionem veniant, non esse rerum differentias morales veras et solidas, sed omnia ex utilitate aut successu metienda, sicut poëta canit:

"Prosperum et felix scelus virtus vocatur;"

et rursus,

"Ille crucem pretium sceleris tulit, hic diadema."

Ac poëtæ quidem hæc satirice et per indignationem loqui videntur: At libri nonnulli politici idem serio et positive supponunt. Sic enim Machiavello dicere placet, "Quod si contigisset Cæsarem bello superatum fuisse, Catalinâ ipso fuisset odiosior:" quasi vero nihil interfuisset, præter fortunam solam, inter furiam quandam, ex libidine et sanguine conflata, atque animum excelsum et, inter homines naturales, maxime omnium (si ambitio abfuisset) suspiciendum. Videmus etiam ex hoc ipso, quam necessarium sit, homines doctrinas pias et ethicas, antequam politicam degustent,

plenis faucibus haurire; nimirum, quod qui in aulis principum et negotiis civilibus, a teneris (ut aiunt) unguiculis innutriti sunt, nunquam fere sinceram et internam morum probitatem assequantur: quanto minus, si accenderit etiam librorum disciplina? Porro, et in documentis ipsis moralibus, vel saltem aliquibus eorum, annon cautio pariter est adhibenda, ne inde fiant homines pertinaces, arrogantes, et insociabiles? Juxta illud Ciceronis de M. Catone: "Hæc bona, quæ videmus, divina et egregia, ipsius scitote esse propria; quæ nonnunquam requirimus, ea sunt omnia non a naturâ, sed a magistris." Sunt et axiomata alia complura, de iis quæ a studiis et libris hominum animis ingenerantur. Verum est enim quod dicit ille, "Abeunt studia in mores:" quod pariter affirmandum de cæteris illis rebus, convictu, famâ, legibus patriis, et reliquis, quas paulo ante recensuimus.

Cæterum animi quædam est cultura, quæ adhuc magis accurata et elaborata videtur, quam reliquæ. Nititur autem hoc fundamento: quod omnium mortalium animi, certis temporibus, reperiantur in statu perfectiore; aliis, in statu magis depravato. Hujus igitur culturæ intentio fuerit et institutum, ut bona illa tempora foveantur, prava vero tanquam ex calendario deleantur et expungantur. Ac bonorum quidem temporum fixatio duobus modis procuratur; votis, aut saltem constantissimis animi decretis, et observantiis atque exercitationibus; quæ non tantum in se valent, quantum in hoc, quod animum in officio et obedientiâ jugiter contineant. Malorum temporum oblitteratio duplici itidem ratione perfici potest; redemptione aliquâ, vel expiatione præteritorum, et novo vitæ instituto, veluti de integro. Verum hæc pars ad religionem plane spectare videtur; nec mirum, cum moralis philosophia vera et genuina (sicut ante dictum est) ancillæ tantum vices erga theologiam suppleat.



Quamobrem, concludemus hanc partem de culturâ animi cum eo remedio, quod omnium est maxime compendiosum et summarium, et rursus maxime nobile et efficax, quo animus ad virtutem efformetur, et in statu collocetur perfectioni proximo. Hoc autem est, ut fines vitæ actionumque deligamus, et nobis ipsis proponamus, rectos et virtuti congruos; qui tamen tales sint, ut eos assequendi nobis aliquatenus suppetat facultas. Si enim hæc duo supponantur, ut et fines actionum sint honesti et boni, et decretum animi de iis assequendis et obtinendis fixum sit et constans; sequetur ut continuo vertat et efformet se animus, unâ operâ, in virtutes omnes. Atque hæc certe illa est operatio, quæ naturæ ipsius opus referat, cum reliquæ, quæ diximus, videantur esse solummodo sicut opera manûs. Quemadmodum enim statuarius, quando simulacrum aliquod sculpsit aut incidit, illius solummodo partis figuram effingit, circa quam manus occupata est, non autem cæterarum (veluti, si faciem efformet, corpus reliquum rude permanet et informe saxum, donec ad illud quoque pervenerit); e contra vero natura, quando florem molitur, aut animal, rudimenta partium omnium simul parit et producit: eodem modo, quando virtutes habitu acquiruntur, dum temperantiæ incumbimus, ad fortitudinem aut reliquas parum proficimus; quando autem rectis et honestis finibus nos dedicaverimus penitus et devoverimus, quæcunque fuerit virtus, quam animo nostro commendaverint et imperaverint fines illi, reperiemus nos jamdudum imbutos et prædispositos habilitate et propensione nonnullâ ad eam assequendam et exprimendam. Atque hic possit esse status ille animi, qui egregie ab Aristotele describitur; et ab eo, non virtutis, sed divinitatis cujusdam caractere insignitur. Ipsa ejus verba hæc sunt: "Immanitati autem consentaneum est opponere eam, quæ supra humanitatem est, heroicam sive divinam virtutem." Et paulo post, "Nam ut feræ neque vitium neque virtus est,

sic neque Dei. Sed hic quidem status altius quiddam virtute est; ille aliud quiddam a vitio." Plinius certe secundus, ex licentiâ magniloquentiæ ethnicæ, Trajani virtutem, divinæ, non tanquam imitamentum, sed tanquam exemplar, proponit, cum ait: "Opus non esse hominibus, alias ad Deos preces fundere, quam ut benignos æque et propitiosos se dominos mortalibus præstarent, ac Trajanus præstitisset." Verum hæc profanam ethnicorum jactantiam sapiunt, qui umbras quasdam corpore majores prensabant. At religio vera, et sancta fides Christiana, rem ipsam petit, imprimendo animis hominum charitatem, quæ appositissime "vinculum perfectionis" appellatur, quia virtutes omnes simul colligat et revincit. Sane elegantissime dictum est a Menandro, de amore sensuali, qui divinum illum perperam imitatur: "amor melior sophistâ lævo, ad humanam vitam." Quibus innuit, morum decus melius ab amore efformari, quam a sophistâ et præceptore inepto, quem lævum appellat. Siquidem universis suis operosis regulis et præceptionibus hominem tam dextere et expedite effingere nequeat, ut se ipsum et in pretio habeat, et se belle in omnibus componat, quam amor facit. Sic proculdubio, si animus cujuscumque fervore charitatis veræ incendatur, ad majorem perfectionem evehetur, quam per universam ethicam doctrinam; quæ sophistæ profecto habet rationem, si cum alterâ illâ conferatur. Quinetiam, sicut Xenophon recte observavit, "Cæteros affectus, licet animum attollant eum tamen distorquere et discomponere per ecstases et excessus suos: amorem vero solum, eum simul et dilatare et componere:" sic omnes aliæ humanæ, quas admiramur, dotes, dum naturam in majus exaltant, excessui interim sunt obnoxie; sola autem charitas non admittit excessum. Angeli, dum ad potentiam, divinæ parem, aspirarent, prævaricati sunt et ceciderunt: "Ascendam et ero similis Altissimo." Homo, dum ad scientiam divinæ parem aspiraret,

prævaricatus est et lapsus: "Eritis sicut dii, scientes bonum et malum." Verum ad similitudinem divinæ bonitatis aut charitatis aspirando, nec angelus nec homo unquam in periculum venit, aut veniet. Imo ad hanc ipsam imitationem etiam invitamur: "Diligite inimicos vestros, benefacite his, qui oderunt vos, et orate pro persequentibus et calumniantibus vos, ut sitis filii Patris vestri, qui in cœlis est, qui solem suum oriri facit super bonos et malos, et pluit super justos et injustos." Quin et in ipso archetypo naturæ divinæ, verba sic collocat religio ethnica ("optimus, maximus"); Scriptura autem sacra pronunciat, "Misericordia ejus super omnia opera ejus."

Hanc itaque moralis doctrinæ partem, de georgicis animi, jam absolvimus. In quâ, si ex intuitu portionum ejus, quas perstrinximus, quis existimet, operam nostram in hoc tantummodo sitam esse, ut ea in artem seu doctrinam redigeremus, quæ ab aliis scriptoribus prætermissa sint, tanquam vulgata et obvia, et per se satis clara et perspicua; suo iudicio libere utatur. Interim illud meminerit, quod ab initio monuimus, propositum a nobis esse, non rerum pulchritudinem, sed usum et veritatem sectari. Recordetur etiam paulisper commentum illud parabolæ antiquæ, de geminis Somni portis:

"Sunt geminæ Somni portæ, quarum altera fertur  
 Cornea, quâ veris facilis datur exitus umbris:  
 Altera candenti perfecta nitens elephanto;  
 Sed falsa ad cœlum mittunt insomnia manes."

Insignis sane magnificentia portæ eburnæ; tamen somnia vera per corneam commeant.

Additamenti vice poni possit circa doctrinam ethicam observatio illa; inveniri nimirum relationem et congruitatem quandam inter bonum animi et bonum corporis. Nam sicut bonum corporis constare diximus ex sanitate, pulchri-

tudine, robore, ac voluptate; sic animi bonum, si juxta moralis doctrinæ scita illud contemplerur, huc tendere perspiciemus, ut animum reddat sanum, et a perturbationibus immunem; pulchrum, verique decoris ornamentis ex-cultum; fortem, ac agilem ad omnia vitæ munia obeunda; denique non stupidum, sed voluptatis et solatii honesti sensum vivide retinentem. Hæc autem, sicut in corpore, ita et in animo raro simul omnia conjunguntur. Facile enim videre est multos, ingenii viribus et fortitudine animi pol-lentes, quos infestant tamen perturbationes, quorumque etiam moribus vix aliquid elegantix aut venustatis aspergi-tur: alios, quibus abunde est in moribus elegantix et ve-nustatis; illis tamen non suppetit, aut probitas animi, ut velint, aut vires, ut possint recte agere: alios, animo præ-ditos honesto, atque a vitiorum labe repurgato, qui tamen nec sibi ipsis ornamento sunt, nec reipublicæ utiles: alios, qui istorum fortasse trium compotes sunt, sed tamen, Stoicâ<sup>35</sup> quâdam tristitiâ et stupiditate præditi, virtutis quidem ac-tiones exercent, gaudiis non perfruuntur. Quod si contingat ex quatuor istis duo aut tria aliquando concurrere, rarissime tamen fit, quemadmodum diximus, ut omnia. Jam<sup>36</sup> vero principale istud membrum philosophiæ humanæ, quæ ho-minem contemplatur, quatenus ex corpore consistit atque animâ, sed tamen segregatum, et citra societatem, a nobis pertractatum est.

# NOVUM ORGANUM,

SIVE INDICIA DE INTERPRETATIONE NATURÆ.

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## PRÆFATIO.

QUI<sup>1</sup> de naturâ, tanquam de re exploratâ, pronuntiare ausi sunt, sive hoc ex animi fiduciâ fecerint, sive ambitiose et more professorio, maximis illi philosophiam et scientias detrimentis affecere. Ut enim ad fidem faciendam validi, ita etiam ad inquisitionem extinguendam et abrumpendam efficaces fuerunt: neque virtute propriâ tantum profuerunt, quantum in hoc nocuerunt, quod aliorum virtutem corruperint et perdiderint. Qui autem contrariam huic viam ingressi sunt, atque nihil prorsus sciri posse asseruerunt, sive ex sophistarum veterum odio, sive ex animi fluctuatione, aut etiam ex quâdam doctrinæ copiâ, in hanc opinionem delapsi sint, certe non contemnendas ejus rationes adduxerunt; veruntamen nec a veris initiis sententiam suam derivarunt, et, studio quodam atque affectatione provecti, prorsus modum excesserunt. At antiquiores<sup>2</sup> ex Græcis (quorum scripta perierunt) inter pronuntiandi jactantiam et acatalepsis desperationem prudentius se sustinuerunt; atque de inquisitionis difficultate, et rerum obscuritate, sæpius querimonias et indignationes miscentes, et veluti frænum mordentes, tamen propositum urgere, atque naturæ se immiscere non destiterunt; consentaneum (ut videtur) existimantes, hoc

ipsum (videlicet utrum aliquid sciri possit) non disputare sed experiri: et tamen illi ipsi, impetu tantum intellectûs usi, regulam non adhibuerunt, sed omnia in acri meditatione et mentis volutione et agitatione perpetuâ posuerunt.

Nostra autem ratio, ut opere ardua, ita dictu facilis est. Ea enim est, ut certitudinis gradus constituamus, sensum per reductionem<sup>3</sup> quandam tueamur, sed mentis opus, quod sensum subsequitur, plerumque rejiciamus; novam autem et certam viam, ab ipsis sensuum perceptionibus, menti aperiamus et muniamus. Atque hoc proculdubio viderunt et illi, qui tantas dialecticæ partes tribuerunt. Ex quo liquet, illos intellectui adminicula quæsisisse, mentis autem processum nativum et sponte moventem, suspectum habuisse. Sed serum plane rebus perditis hoc adhibetur remedium; postquam mens ex quotidianâ vitæ consuetudine et auditionibus, et doctrinis inquinatis occupata, et vanissimis idolis obsessa fuerit. Itaque ars illa dialecticæ, sero (ut diximus) cavens, neque rem ullo modo restituens, ad errores potius figendos, quam ad veritatem aperiendam, valuit. Restat unica salus ac sanitas, ut opus mentis universum de integro resumatur; ac mens, jam ab ipso principio, nullo modo sibi permittatur, sed perpetuo regatur; ac res, veluti per machinas, conficiatur. Sane si homines opera mechanica nudis manibus, absque instrumentorum vi et ope, aggressi essent, quemadmodum opera intellectualia nudis fere mentis viribus tractare non dubitarunt, parvæ admodum fuissent res, quas movere et vincere potuissent, licet operas enixas, atque etiam conjunctas, præstitissent. Atque si paulisper morari, atque in hoc ipsum exemplum, veluti in speculum, intueri velimus; exquiramus (si placet), si forte obeliscus aliquis, magnitudine insignis, ad triumphî vel hujusmodi magnificentiæ decus transferendus esset, atque id homines nudis manibus aggredierentur, annon hoc magnæ cujusdam esse dementiæ, spectator quispian rei sobrius

fateretur? Quod si numerum augerent operariorum, atque hoc modo se valere posse confiderent, annon tanto magis? Sin autem delectum quendam adhibere vellent, atque imbecilliores separare, et robustis tantum et vigentibus uti, atque hinc saltem se voti compotes fore sperarent, annon adhuc eos impensius delirare diceret? Quin etiam si, hoc ipso non contenti, artem tandem athleticam consulere statuerent, ac omnes deinceps manibus, et lacertis, et nervis, ex arte bene unctis et medicatis, adesse juberent, annon prorsus eos dare operam, ut cum ratione quâdam et prudentiâ insanirent, clamaret? Atque homines tamen simili male sano impetu et conspiratione inutili feruntur in intellectualibus; dum ab ingeniorum vel multitudine et consensu, vel excellentiâ et acumine, magna sperant; aut etiam dialecticâ (quæ quâdam athletica censi possit) mentis nervos roborant; sed interim, licet tanto studio et conatu (si quis vere judicaverit) intellectum nudum applicare non desinunt. Manifestissimum autem est, in omni opere magno, quod manus hominis præstat, sine instrumentis et machinis, vires nec singulorum intendi, nec omnium coire, posse.

Itaque ex his quæ diximus præmissis, statuimus duas esse res de quibus homines plane monitos volumus, ne forte illæ eos fugiant aut prætereant. Quarum prima hujusmodi est; fieri fato quodam (ut existimamus) bono, ad extinguendas et depellendas contradictiones et tumores animorum, ut et veteribus honor et reverentia intacta et imminuta maneant, et nos destinata perficere, et tamen modestiæ nostræ fructum percipere, possimus. Nam nos, si profiteamur nos meliora afferre quam antiqui<sup>4</sup>, eandem quam illi viam ingressi; nullâ verborum arte efficere possimus, quin inducatur quædam ingenii, vel excellentiæ, vel facultatis comparatio sive contentio; non ea quidem illicita aut nova (quidni enim possimus, pro jure nostro, neque eo ipso alio, quam omnium, si quid apud eos non recte inventum aut positum sit,

reprehendere aut notare?); sed tamen, utcunque justa aut permissa, nihilominus impar fortasse fuisset ea ipsa contentio, ob virium nostrarum modum. Verum cum per nos<sup>5</sup> illud agatur, ut alia omnino via intellectui aperiatur, illis intentata et incognita, commutata jam ratio est; cessant studium et partes; nosque indicis tantummodo personam sustinemus; quod mediocris certe est auctoritatis, et fortunæ cujusdam, potius quam facultatis et excellentiæ. Atque hæc moniti species ad personas pertinet, altera ad res ipsas.

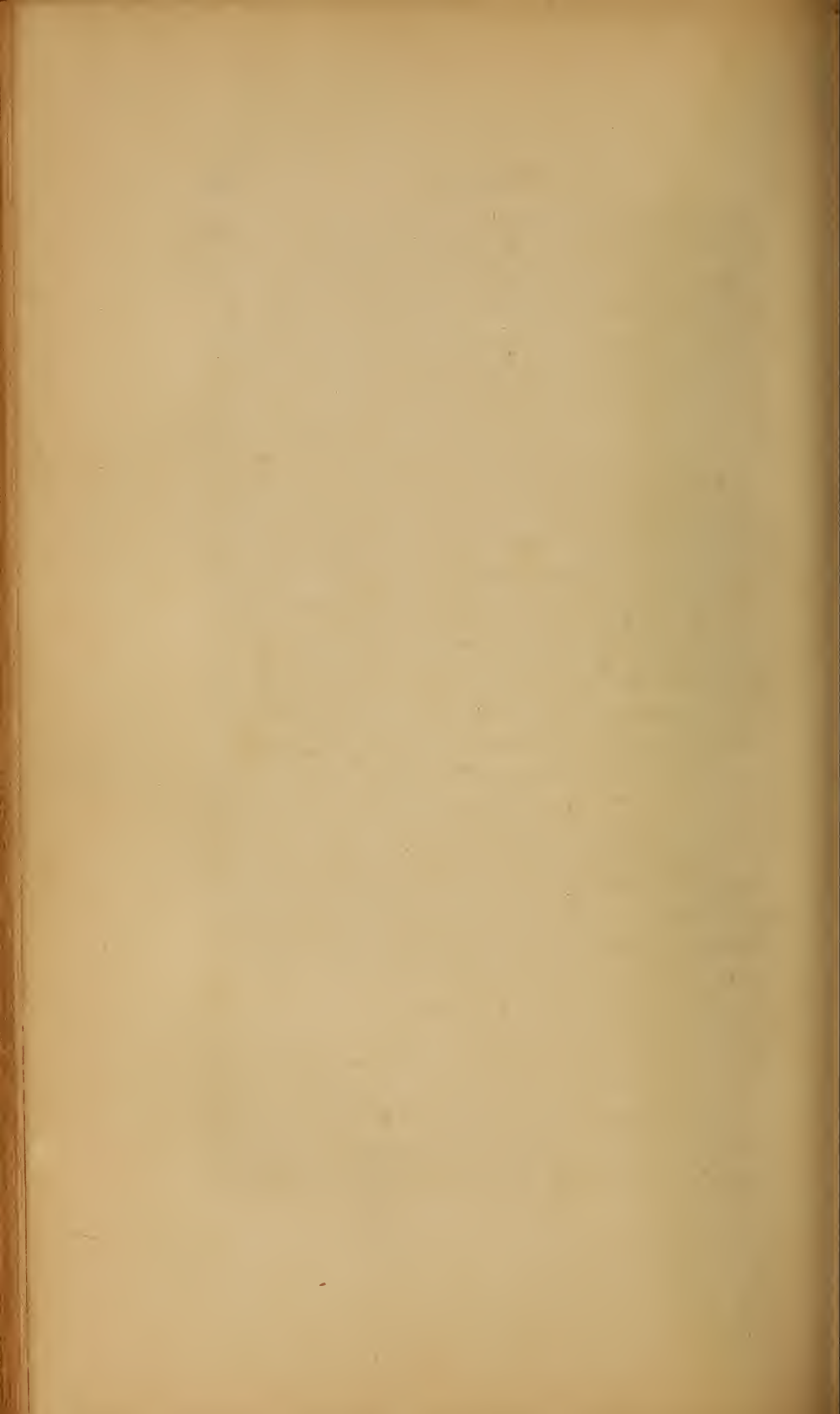
Nos siquidem de deturbandâ eâ, quæ nunc floret, philosophiâ, aut si quæ alia sit aut erit hâc emendatior aut auctior, minime laboramus. Neque enim officimus, quin philosophia ista recepta, et aliæ id genus, disputationes alant, sermones orient, ad professoria munera et vitæ civilis compendia adhibeantur et valeant. Quin etiam aperte significamus et declaramus, eam quam nos adducimus philosophiam ad istas res admodum utilem non futuram. Non præsto est; neque in transitu capitur; neque ex prænotionibus intellectui blanditur; neque ad vulgi captum, nisi per utilitatem et effecta, descendet.

Sint itaque (quod felix faustumque sit utrique parti) duæ doctrinarum emanationes, ac duæ dispensationes; duæ similiter contemplantium sive philosophantium tribus ac veluti cognationes; atque illæ neutiquam inter se inimicæ aut alienæ, sed fœderatæ, et mutuis auxiliis devinctæ: sit denique alia scientias colendi, alia inveniendi, ratio. Atque quibus prima potior et acceptior est, ob festinationem, vel vitæ civilis rationes, vel quod illam alteram ob mentis infirmitatem capere et complecti non possint (id quod longe plurimis accidere necesse est), optamus ut iis feliciter et ex voto succedat quod agunt, atque ut quod sequuntur teneant. Quod si cui mortalium cordi et curæ sit, non tantum inven-tis hæreret, atque iis uti, sed ad ulteriora penetrare; atque



non disputando adversarium, sed opere naturam vincere; denique non belle et probabiliter opinari, sed certo et ostensive scire: tales tanquam veri scientiarum filii, nobis (si videbitur) se adjungant; ut, omissis naturæ atriis, quæ infiniti contriverunt, aditus aliquando ad interiora patefiat. Atque ut melius intelligamur, utque illud ipsum, quod volumus, ex nominibus impositis magis familiariter occurrat; altera ratio sive via, “ Anticipatio<sup>6</sup> mentis;” altera<sup>7</sup> “ Interpretatio naturæ,” a nobis appellari consuevit.

Est etiam quod petendum videtur. Nos certe cogitationem suscepimus, et curam adhibuimus, ut quæ a nobis proponuntur, non tantum vera essent, sed etiam ad animos hominum (licet miris modis occupatos et interclusos) non incommode aut aspere accederent. Veruntamen æquum est, ut ab hominibus impetremus (in tantâ præsertim doctrinarum et scientiarum restauratione) ut qui de hisce nostris aliquid, sive ex sensu proprio, sive ex auctoritate turbâ, sive ex demonstrationum formis (quæ nunc tanquam leges quædam judiciales invaluerunt), statuere aut existimare velit, ne id in transitu, et velut aliud agendo, facere se posse speret; sed ut rem pernoscatur; nostram, quam describimus et munimus, viam ipse paulatim tentet; subtilitati rerum, quæ in experientiâ signata est, assuescat; pravos denique, atque alte hærentes mentis habitus, tempestivâ et quasi legitimâ morâ, corrigat; atque tum demum (si placuerit), postquam in potestate suâ esse cœperit, iudicio suo utatur.



# P R E F A C E

## TO THE INSTAURATIO MAGNA.

ON THE STATE OF THE SCIENCES; THAT IT IS NEITHER PROSPEROUS NOR GREATLY ADVANCED, AND THAT AN ENTIRELY DIFFERENT WAY FROM ANY KNOWN TO OUR PREDECESSORS MUST BE OPENED TO THE HUMAN UNDERSTANDING, AND OTHER AIDS BE PROCURED, TO ENABLE THE MIND TO EXERCISE ITS JURISDICTION OVER THE NATURE OF THINGS.

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MEN seem to us not to be sufficiently acquainted with either their acquisitions or their powers; but to overrate the former, to underrate the latter. And so it comes to pass, that either, holding such arts as they are acquainted with in extravagant estimation, they seek for nothing further, or, undervaluing themselves beyond what they ought, they waste their powers on trivial objects, and make no effort in pursuit of such as might be of real importance. The consequence is, that the sciences also have their pillars fixed, as it were, by fate, since men are not excited to penetrate further either by desire or hope. And, seeing that a belief in the existence of plenty is one of the main causes of dearth, and as, from a reliance on present resources, that which will really aid us hereafter is neglected, it becomes useful, nay, absolutely necessary, that we should, in the very opening of our work, and this without circumlocution or disguise, divest the existing state of knowledge of all undue respect and admiration, by the wholesome

warning not to exaggerate or applaud its extent or usefulness. For, if any one look with ordinary vigilance into that vast variety of books of which the arts and sciences boast, he shall every where find endless repetitions of the same thing, varied in the mode of treatment, but anticipated in discovery; so that all, though at first sight appearing numerous, shall, on undergoing examination, be found scanty. And, with regard to its usefulness, I must give my opinion plainly; that that philosophy, which we have principally derived from the Greeks, seems but a childhood of philosophy, and is marked by the characteristics of childhood, being ready enough for idle loquacity, but impotent and immature for generation. For it is fruitful of controversies, barren of effects. So that the fable of Scylla seems vividly to portray the present state of learning; who presented the features and countenance of a virgin, but had barking monsters surrounding and attached to her womb. Even so the sciences, to which we have been accustomed, have their specious and plausible generalities; but, on descending to particulars, as it were to the organs of generation, to see what fruit and effect they produce, then spring up contentions and barking disputations, in which they end, and which take the place of offspring. But further, if the sciences of this kind were not evidently a lifeless thing, it is clear that that never would have occurred, which now for many ages has been, in fact, the case,—that they remain almost stationary and receive no increase worthy of mankind; and this so completely, that frequently, not only does an assertion remain an assertion, but even a question remains a question, which, so far from being determined by disputation, is even fixed and encouraged; and every transmitted and successive system of instruction represents and exhibits the characters of teacher and hearer, not of inventor and of another who can add something original to what is

already invented. But in the mechanical arts we see quite the contrary happen; for they, as if inhaling vital air, daily increase and receive perfection; and in the hands of the original inventors generally appear rude, and in a manner cumbrous and shapeless, but afterwards acquire new adaptations and degrees of serviceableness, to such a degree that the wishes and desires of men decline and change before they have reached their utmost height and perfection. Philosophy, on the other hand, and the intellectual sciences, like statues, are adored and applauded, but are not carried forward; nay, not unfrequently, they are most flourishing in the hands of their first originators, and ever afterwards degenerate. For, when men have once voluntarily surrendered themselves, and gone over (like silent senators) to the opinion of an individual, they do not extend the limits of the sciences themselves, but perform the servile duty of doing homage to, and waiting upon, particular authors. Nor let any one allege this, that the sciences, slowly increasing, at length attained their full stature, and from that time (having performed the course allotted to them) took up their settled abode in the works of a few; and that, as no further improvement could be made, it, of course, only remained, that what had been already discovered should be adorned and cultivated. It were desirable, indeed, that such were the case; but the more correct and true statement is, that this enslaved condition of the sciences has arisen purely from the audacity of a few, and the sloth and inactivity of the rest of mankind; for after the sciences have been, in their particular branches, diligently enough, perhaps, cultivated and elaborated, then usually some one has sprung up, confident in his talent, and welcomed and applauded on account of the compendious nature of his method, who, in appearance, gave system to science, whilst, in reality, he rendered useless the labours

of his predecessors. Yet this conduct is wont to be well-pleasing to succeeding generations, from the ready use they can make of his work, and their weariness and dislike of enduring continued investigation. But, if any one be influenced by the inveterate uniformity of opinion, as if it were the verdict of time, let him be assured that he relies on a very fallacious and weak consideration; for, in the first place, we are in a great degree unacquainted with the amount of knowledge of the arts and sciences, which, in various ages and places, has been acquired and brought to light, much less are we acquainted with the attempts and secret meditations of individuals, so that neither the births nor abortions of time appear recorded in registers. Besides, even uniformity of opinion itself, and its long continuance, are not to be thought so highly of. For, however various may be the kinds of civil polity, there is but one polity of the sciences, and that has ever been, and ever shall remain, the democratic. Now, with the people, the doctrines that most prevail are the disputatious and contentious, or the specious and vain,—such, that is to say, as either ensnare or allure assent; and so, without question, the greatest geniuses have, in every age, suffered violence, whilst others, though possessed of no vulgar capacity and understanding, have, nevertheless, from a regard to their reputation, submitted to the decision of the time and the multitude. Wherefore, if, haply, more elevated speculations have any where shone forth, they have been forthwith blown about and extinguished by the winds of popular opinion; so that time, like a river, has carried down to us that which is light and inflated, and has sunk that which is weighty and solid. Nay, those very leaders who have usurped a sort of dictatorship in the sciences, and dogmatized on things with so much boldness, will yet, when they occasionally return to their senses, indulge in complaints on the sub-

tility of nature, remoteness of truth, obscurity of things, the complication of causes, and the weakness of the human understanding; in this, however, not a whit more modest, since they prefer blaming the common condition of man and of things, to confessing their own defects. Besides, this is a habit of theirs, that whatsoever object any particular art fails of accomplishing, they conclude from the same art that it cannot be accomplished. Nor, indeed, can any art be condemned, when she herself deliberates and decides on the matter. This, therefore, is their aim, that their ignorance may be saved from ignominy. Now, the philosophy that has been transmitted to us, and received by us, admits of this general description: barren as to effects, fruitful in questions, backward and languid in its growth, presenting a show of perfection in its generality, but ill-filled up in its details, popular in its choice, and suspected by its very promoters, and, for this reason, fortified and countenanced by sundry artifices. But, with respect to those who have determined to try for themselves, and to devote themselves to the sciences, and to extend their limits, not even these have ventured wholly to abandon received opinions and to seek the fountain-head of truth. But they think they have achieved something great, if they intersperse and add something of their own, prudently reflecting that, by their assent they can save their modesty, by their additions their liberty. But, whilst seeking to satisfy the opinions of others, and the usage of the day, this admired moderation tends to the great injury of the sciences; for it is scarcely possible both to admire and to surpass authors, but the case is like that of water, which rises no higher than its source. Accordingly, men of this class amend some things, but make little advancement, and improve rather than enlarge. Still there have been found persons, who, with greater daring, have considered every thing open to them,

and, exerting the force of genius, have made a passage for themselves and for their dogmas, by levelling and destroying all anterior systems; from whose violence no great advantage has resulted, for they have exerted themselves, not to enlarge philosophy and the arts in their subject-matter and effects, but merely to substitute dogmas, and to transfer to themselves the empire of opinions; with but little fruits truly, since opposite errors usually spring from common causes. But if some few individuals, enslaved neither to the dogmas of others nor their own, but favourable to liberty, have been so spirited as to desire others to share investigation with them, they, truly, are honest in their aim, but feeble in their effort. For they seem to have followed only probable reasonings, and are hurried about in a whirl of arguments, and by an indiscriminate license of investigation have weakened the strictness of inquiry. But no one has been found to dwell for the necessary time on things themselves and experience. And some, again, who have committed themselves to the waves of experience, and become almost mechanics, yet even in their experience employ an unsteady mode of investigation, and do not war with it according to any certain rule; nay, too, many have proposed to themselves certain petty tasks, esteeming it a great thing if they can work out some one discovery,—a plan no less mean than unscientific. For no one can rightly or successfully examine the nature of anything in the thing itself; but, after a laborious varying of experiments, he rests not, but finds subject for further inquiry. And one observation especially is not to be omitted, that all the industry employed in experimenting has, from the very first, with too forward and intemperate eagerness, grasped at some purposed effects; has sought (I say) fruit-bearing, not light-bearing experiments; and has not imitated the divine method, which on the first day created light only,



and devoted to that one entire day, and did not on that day produce any works formed of matter, but on the following days descended to their creation. But those who have magnified the use of logic, and have thought that the surest aids to science might be derived from it, have seen, most truly and correctly, that the understanding of man, when left to itself, justly deserves to be suspected. But the remedy is totally inadequate to meet the evil, and is not itself unattended with evil, forasmuch as the received system of logic, although it may be applied with perfect propriety to civil matters and such arts as rest in discussion and opinion, yet is far from being able to cope with the subtlety of nature, and by catching at that which it cannot grasp, has been more efficacious in confirming, and, as it were, riveting errors, than in opening the way to truth.

To sum up, therefore, our observations, neither men's reliance upon others, nor their own industry, appears to have hitherto shed a happy light around the sciences; especially as there is little aid afforded by such demonstrations and experiments as have been hitherto in use. Moreover, the fabric of this universe, to the human understanding contemplating it, is in its structure like a labyrinth, where so many doubtful paths, such deceptive similitudes of things and signs, such winding and intricate mazes and knots of nature, every where present themselves; where the journey, too, must be constantly made under the unsteady light of the senses, shining and disappearing by fits through the forests of experience and of particular facts: nay more, the guides, as has been said, who offer their services, are themselves perplexed, and increase the number of wanderings and of wanderers. In a case so difficult we must despair of man's unassisted judgment, or even of casual good fortune; for neither the excellence of genius, however great, nor the die of experiment, however frequently thrown, can over-

come such disadvantages. Our steps must be guided by a clue; and all the way, even from the first perceptions of the senses, must be secured by a certain method. Nor must these observations be interpreted to mean, that nothing whatever was accomplished through so many ages, by so many labours, for I do not undervalue existing discoveries. And the ancients have certainly shewn themselves worthy of admiration in those matters which depend upon force of thought and abstract meditation. But as, in former ages, when men at sea used to direct their course only by the observation of the stars, they were indeed able to coast the shores of the old continent, or cross some minor inland seas; but before the ocean could be crossed, and the regions of a new world discovered, it was necessary that the use of the compass, a more trusty and certain guide of their voyage, should become known: even so the things which heretofore have been discovered in the arts and sciences are of such a nature, that they might have been arrived at by practice, meditation, observation, and discussion, as being nearer to the senses, and lying almost beneath our common notions; but before we can approach the more remote and hidden parts of nature, it is of necessity required that a better and more perfect use and application of the human understanding should be introduced.

We, at least, overcome by the eternal love of truth, have committed ourselves to uncertain, steep, and desert tracts, and trusting in, and resting on, the Divine assistance, have borne up our mind against the violence of opinions, drawn up as if in battle array, against our own internal hesitations and scruples, against the mists and clouds of nature, and fancies flying on all sides around; with this view, that we might at length procure more trust-worthy and certain directions for the present and future ages. And if we have made any advance in this matter, no other method

hath opened unto us the way, but the true and genuine humiliation of the human soul. For all our predecessors who applied themselves to discovery in the arts, after casting their eyes awhile upon things and instances and experience, straightway, as if discovery were nothing else than an effort of thought, invoked as it were their own spirits to utter oracles to them. But we, modestly and perseveringly, keeping ourselves conversant with nature, abstract our intellect from things no farther than is necessary to allow their images and beams to converge (as in the case of sight). And thus it happens that but little is left to the strength and superiority of genius. And in our teaching we have adhered to the same humility which we employ in discovery; for we do not endeavour to assume or to acquire any dignity for these our discoveries, either by the triumphs of confutations, or the citing of antiquity, or by a kind of usurpation of authority, or even by the veil of obscurity, things which it would not be difficult for one to discover who was endeavouring to throw light on his own name, rather than on the minds of others. We have not (I say) practised either force or fraud on men's judgments, nor do we propose to do so; but conduct them to nature itself, and the real connexions of nature, that they themselves may see what they possess, what they prove, what they add and contribute to the common stock. But if we, in any matter, have given too easy credit, or slumbered and been inattentive, or mistaken our road, and broken off investigation, we still exhibit things so plainly and openly, that our errors can be noted and set aside before they taint to any depth the mass of science; and, also, the continuation of our labours will be easy and unembarrassed. And, by this method, we think we have established for ever a real and legitimate union between the empirical and rational facul-

ties, whose sullen and inauspicious divorce and separation have disturbed everything in the family of mankind.

Wherefore, since these matters are not in our control, in the beginning of our work we pour forth most humble and ardent prayers to God the Father, God the Word, and God the Spirit, that, mindful of the miseries of man and of this pilgrimage of life, in which we wear out few and evil days, they would vouchsafe to endow the family of man, through our hands, with these their new gifts. And, moreover, we humbly pray that human knowledge may not prejudice Divine truth; and that no incredulity and darkness with respect to the divine mysteries may arise in our minds, from the unlocking of the ways of sense and greater kindling of natural light; but rather, that by a pure understanding, cleared of fancies and vanity, and no less submitted, nay, wholly prostrated, before the divine oracles, there may be rendered to faith the tribute due to faith. Lastly, that, being relieved from the poison of knowledge infused by the serpent, wherewith the human soul is swollen and puffed up, we may not be high-minded, but think soberly, and seek the truth in love.

Having thus concluded our prayers, turning to men, we both offer some salutary admonitions and make some just requests. First, we admonish men (as we have also prayed) that, as regards divine things, they keep their senses in their proper office. For the senses, like the sun, reveal the surface of the terrestrial globe, but close and seal up that of the celestial. Next, that, in their avoidance of this error, they may not fall into the opposite; which will certainly be the case, if they consider the investigation of nature in any respect prohibited as if by interdict. For it was not that pure and innocent knowledge of nature, by which Adam gave names to things from their properties, that was the origin or occasion of the fall; but that ambi-

tious and imperious desire for moral knowledge distinguishing good from evil, with this intent, that man might revolt from God and govern himself: this was the ground and the means of temptation. With regard to the sciences which observe nature, the sacred philosopher declares, that "it is the glory of God to conceal a thing, but the honour of kings to search out the matter;" just as if the divine nature were amused with the innocent and gentle play of children, who hide themselves that they may be found; and, from its indulgence and goodness towards mankind, had chosen the human soul, as a playmate for itself in this amusement. Lastly, we would admonish all in general, to consider the true ends of knowledge; and that they seek it not either for mental gratification, or for disputation, or that they may despise others, or for lucre, or fame, or power, or such like low objects, but for its intrinsic worth, and the purposes of life, and that they would perfect and govern it in charity. For by the desire of power the angels fell, and man by the desire of knowledge: but there is no excess in charity; neither angel nor man was ever endangered by it.

Such are the requests we make. Of ourselves we say nothing; but for our subject matter we claim, that men may not consider it an opinion, but a work; and may look on it as certain, that we are not laying the foundations of any sect or system, but of what will really benefit and dignify mankind. In the second place, that, divesting themselves of the jealousies and prejudices of opinions, they may fairly consult in common for their own interests, and, being rescued and secured from the errors and obstructions of the road by our defence and aid, they may themselves participate in the remaining labours. Moreover, that they be strong in hope, and do not pretend or imagine that our Instauration is an endless task, and beyond

human strength ; when in truth it is an end and legitimate termination of infinite error, and is mindful of mortality and the condition of man, not expecting that the matter can be altogether completed within the course of one age, but bequeathing it to posterity ; and, finally, does not arrogantly seek the sciences in the narrow cells of the human understanding, but humbly in the greater world ; and that which is empty is generally vast, while solid matter is usually condensed, and occupies but small space. Lastly, also, it seems but a fair claim (lest any person should be inclined to do injustice to us, on the very point on which our subject turns), that men, after considering what we must needs assert, if we would only maintain consistency, should reflect how far they can think they have the privilege of forming an opinion or giving judgment on this our work ; since we reject all that exercise of the human reason which is premature, anticipating, carelessly and too rapidly abstracted from things, judging it to be, as far as regards investigation of nature, a thing irregular, confused, and badly constructed ; nor is it to be required that we should be judged by that standard which we ourselves arraign.

## DISTRIBUTION OF THE WORK.

IT CONSISTS OF SIX PARTS.

FIRST, THE DIVISIONS OF THE SCIENCES.	TORY FOR THE FOUNDING OF PHILOSOPHY.
SECOND, THE NOVUM ORGANUM, OR DIRECTIONS RESPECTING THE INTERPRETATION OF NATURE.	FOURTH, THE LADDER FOR THE UNDERSTANDING.
THIRD, THE PHENOMENA OF THE UNIVERSE, OR NATURAL AND EXPERIMENTAL HIS-	FIFTH, PRECURSORS, OR ANTICIPATIONS OF THE SECOND PHILOSOPHY.
	SIXTH, SECOND PHILOSOPHY, OR ACTIVE SCIENCE.

### THE ARGUMENTS OF THE SEVERAL PARTS.

It is part of our design, that all things should be stated as openly and clearly as possible. For this nakedness of the mind, as once that of the body, is the companion of innocence and simplicity. The order, therefore, and plan of the work, shall first be set forth. We arrange it in six parts. The First Part exhibits a summary, or universal description of such science and learning as mankind, up to the present time, is possessed of. For it seemed good to us, to dwell a little even on received notions: with this view, that the old may be more readily perfected, and access gained to the new. For we are influenced with nearly equal zeal both for the improvement of the old, and the attainment of something further. This method is also of avail towards our obtaining credit; according to the text, "The unlearned receives not the words of knowledge, unless you first speak of what is

within his own heart." We shall not, therefore, neglect coasting the shores of the now received sciences and arts, and also importing thither something useful on our passage.

Furthermore, we employ such divisions of the sciences as may comprehend not only what is already discovered and known, but what has been hitherto passed over, and is wanting. For there are found both cultivated and desert tracts in the intellectual as well as in the terrestrial globe. It must not, therefore, appear extraordinary, if we occasionally depart from the usual divisions. For additions, whilst they vary the whole, of necessity vary the parts and their subdivisions, but the received divisions are only adequate to the received body of science. With regard to what we shall note as omitted, we shall pursue the plan of not merely stating trivial titles and concise arguments of what is deficient: for, in case we class any thing amongst the omissions, the meaning of which may seem to be rather obscure (so that we may have grounds for suspecting that men will not readily understand our intention, or the nature of the matter we embrace in our conception and contemplation), it shall be our constant care (provided the subject be worthy), either to subjoin instruction for the completion of a work of this kind, or even a portion of the work completed by ourselves, by way of example for the whole; that in each individual case we may aid either by work or by counsel. For we have thought that it concerns our own reputation as well as the advantage of others, that no one may imagine a mere passing idea of such matters to have crossed our minds, or that the things which we desire and aim at are only the creatures of our wishes. Whereas, in truth, they are of such a nature, that they are obviously within the sphere of human power (if men be not wanting to themselves), and we ourselves are possessed of a sure and clear method of attaining them. For we have not undertaken to measure out



regions in our mind, like augurs, for the purposes of divination; but to enter them, like military commanders, with a design of doing actual service. And this is the First Part of the Work.

NEXT, having passed over the ancient arts, we shall prepare the human understanding for further progress. Accordingly, what is assigned to the Second Part is the doctrine respecting a better and more perfect employment of reason in the investigation of things, and respecting the true helps of the understanding; in order that thereby (so far as the condition of humanity and mortality allows) the understanding may be exalted, and furnished with more ample powers for mastering the arduous and obscure parts of nature. And that art which we bring forward (which we have been in the habit of calling the interpretation of nature), is of the nature of logic; although the difference between them is considerable, nay indeed, something passing measure. For the common logic also professes to contrive and furnish aids and guards for the understanding; and in this alone they agree. But it altogether differs from the common logic in three things especially, namely, its end, the order of demonstration, and the beginning of the inquiry.

For the end proposed to this our science is to discover, not arguments, but arts; and not what may be accordant with principles, but principles themselves; not probable reasons, but directions and indications of effects. Accordingly, from a diversity of purpose follows a diversity of result. For, in the former method, an opponent is vanquished and constrained by disputation; in our method, nature, by operation.

And with these diverse ends agree the nature and order of demonstration in the two. For, in the vulgar logic,

almost the whole labour is spent upon the syllogism. But of induction the logicians seem to have scarcely thought seriously; passing it over with slight notice, and hurrying on to formulæ of disputation. But we reject the syllogistic demonstration, as proceeding too confusedly, and allowing nature to escape from our hands. For, although no one can doubt that those things which agree in the middle term, agree also with one another (which is of the nature of mathematical certainty); nevertheless, this fallacy lurks in the method, that the syllogism consists of propositions, the propositions of words, and words are but the tokens and signs of notions. Accordingly, if the notions themselves of the mind (which are, as it were, the soul of words, and the basis of this whole structure and edifice) are badly and carelessly abstracted from things, and vague, or not sufficiently defined and limited, or, in short, faulty in any other respect, as they may be in several, the whole fabric falls to the ground. We, therefore, reject the syllogism, and that not only as regards first principles (to which even the logicians themselves do not apply it), but also with regard to intermediate propositions; which, indeed, the syllogism, in some way or other, brings forth and produces, but they are such as are barren of effects, and remote from practice, and plainly inadequate to the active part of the sciences. Although, therefore, we would leave to the syllogism, and to such celebrated and applauded demonstrations, their jurisdiction over the popular and speculative arts (for we make no alteration in this department), yet, for investigating the nature of things, we employ induction throughout, as well for the minor as for the major propositions. For we consider induction to be that form of demonstration which assists the senses, and closes in upon nature, and presses on, and, as it were, incorporates itself with works.

Wherefore, the order of demonstration also is altogether reversed; for hitherto the matter has been wont to be managed in this way, that flight is taken at once from the intimations of the senses, and from particular facts, up to the highest generalizations, as if to fixed poles, round which disputations may revolve, and other propositions are derived from them by means of middle terms: a way short, it is true, but abrupt and which cannot lead to nature, though easy and well-suited to disputation. But in our method axioms are raised up in gradual succession and step by step, so that we do not arrive at the most general statement, until the last stage; and these general statements come out, not notional, but well-defined, and such as nature may acknowledge to be really well-known to her, and which shall cleave to the very marrow of things.

But it is in the very form of the induction, and the conclusion which is arrived at by it, that we engage in by far the greatest work. For that form of which the logicians speak, which proceeds by bare enumeration, is a puerile thing, arrives at precarious conclusions, is exposed to danger from any contrary instances, considers only what is usual, and does not discover any final result. But the sciences require an induction of such a form as may analyze and separate experiments, and arrive at conclusions necessarily true, by a proper series of exclusions and rejections. If, however, the vulgar method of judgment, in use among the logicians, has been so laboured, and has employed such great geniuses, how much labour must be expended upon this of ours, which is drawn, not from the recesses of the mind, but from the very vitals of nature?

Nor yet do we rest here; for we sink the foundations of the sciences to a greater depth, and construct them with more solidity, and we take up the beginning of our investigation at an earlier point, than men have hitherto done;

by submitting to examination those matters which the common logic receives, as it were, upon the credit of others. For the logicians borrow scientific principles from the several sciences; again, they worship the first-formed notions of the mind; and, lastly, they rest satisfied with the immediate informations of the senses, if well adjusted. But we have resolved that the true logic should enter upon the several provinces of the sciences with authority paramount to what is possessed by their first principles, and that it should force even those very supposed first principles to give an account how far they are admissible. And with regard to the first-formed notions of the understanding; there is not any of those things which the understanding, left to itself, has collected, but is held by us in suspicion, and not in any respect deserving of acceptance, unless it puts itself upon a new trial, and therefrom receives confirmation. Moreover, we sift, in many ways, the informations of the senses themselves. For the senses deceive, it is true; but they also point out their own errors; the errors, however, are close at hand, their detections are to be sought from afar.

The imperfections of the senses are two-fold, for they either fail us or deceive us. For, in the first place, there are several things which escape the senses, however well adjusted and wholly unimpeded, either on account of the subtlety of the whole body, or the minuteness of its parts, or the remoteness of place, or the slowness, or again the velocity of motion, or the familiarity of the object, or for some other reason. And again, the apprehensions of the senses are not very much to be relied on, even when they grasp the object. For the testimony and information of the senses always bear relation to the man, not to the universe; and it is a very great error to assert that the senses are the measure of things.

Accordingly, that we might obviate these difficulties, we have, with laborious and faithful service, sought and collected helps for the senses from all quarters, in order that deficiencies may be removed by additions, and errors by corrections. Nor do we seek to effect this so much by instruments as by experiments; for the subtlety of experiments is far greater than that of the senses, even when aided by the nicest instruments (we speak of such experiments as are skilfully and artistically devised, in accordance with the design of the inquiry). We attach, therefore, but little importance to the immediate and unaided perceptions of the senses; but we reduce the matter to this, that the senses should decide only on the experiment, and the experiment on the matter in question. Wherefore, we think that we have proved ourselves most observant priests of the senses (by which all things existing in nature must be investigated, if we would act rationally), and no unskilful interpreters of their oracles, so that others seem to observe and worship them in profession only, we in deed and truth. And such are the means which we provide for throwing light upon nature, and for the kindling and immission of this light; which means would of themselves be sufficient, if the human understanding were even and like a smoothed surface. But since the minds of men are so wonderfully beset, that a clear and polished surface for receiving the true rays of things is wholly wanting, necessity urges us to think that a remedy should be sought for this also.

Now, the idols with which the mind is preoccupied are either adventitious or innate. The adventitious have made their way into the minds of men, either from the dogmas and sects of philosophers, or from perverse rules of demonstrations. But the innate are inherent in the nature of the understanding itself, which appears to be much more prone to error than the senses. For, however self-satisfied men

Idols. }
 

- adventitious { from dogmas
- { from perverse rules
- innate           { from the understanding

may be, and however they may rush into an admiration and almost adoration of the human mind, this is a most certain fact, that, as an uneven mirror changes the rays of objects, according to its own figure and the shape of its surface, so the mind, when affected by external objects through the senses, in stating and unfolding the notions it receives, in a manner by no means trustworthy, blends and mingles its own nature with the nature of things.

And the two first kinds of idols are eradicated with difficulty; the latter cannot be eradicated at all. It is only in our power to point them out, and to mark and denounce that insidious tendency of the mind; lest, haply, from the destruction of the old, new shoots of error should in their place spring up, on account of the vicious disposition of the mind, and the matter should fall back to this, that the errors would be only changed, instead of being extinguished: but, on the other hand, it must be for ever confirmed and established, that the understanding cannot judge otherwise than by induction and by a genuine form of it. Wherefore this doctrine of the purifying of the understanding, to fit it for the reception of truth, consists of three refutations: the refutation of systems of philosophy; the refutation of methods of demonstration; and the refutation of the natural errors of the human intellect. But when this has been completed, and when it has been at length discovered what the nature of things, and what the nature of the mind may produce, we think that we have prepared and adorned a nuptial couch for the Mind and the Universe, the Divine Goodness being bride-maid. But let the prayer of our nuptial song be, that from this union may spring helps to mankind, and an offspring of such inventions as may in some degree mitigate and overcome the wants and miseries of man. And this is the Second Part of our Work.

BUT it is not our intention merely to point out and secure the ways, but also to enter upon them. Accordingly, the Third Part of the Work comprehends the phenomena of the universe: that is to say, experience of every kind, and such a natural history as may serve for a basis on which to rear the fabric of philosophy. For there is no method of demonstration, or form of interpreting nature, however excellent, which, as it can defend and support the mind against error and failure, so also can provide and supply it with the materials of knowledge. But, by all whose determination is, not to guess and divine, but to discover and know, and who resolve not to invent chimerical and fabulous systems of the universe, but to inspect and, as it were, to dissect the nature of this real world,—all knowledge must be derived from things themselves. Nor can any substitution or compensation of genius, or meditation, or argumentation, supply the place of this labour, investigation, and personal survey of the world; not though all the intellectual powers of all mankind were to combine. Accordingly, either this method must be wholly adopted, or the undertaking must be for ever abandoned. But, up to the present day, men have so conducted themselves that it is not at all wonderful if nature does not put herself in their power.

For, in the first place, the defective and fallacious information of the senses themselves; a method of observation careless and unsteady, and, as it were, casual; tradition, worthless, and depending on hearsay; practice, intent on effects, and servile; experimental efforts, blind, dull, vague, and abrupt; and, lastly, a natural history, trifling and meagre, have collected together most corrupt materials for philosophy and the sciences.

And then an ill-timed subtilty, and empty display of argument, attempts a late remedy for a case which is clearly

desperate; and does not in any respect mend the matter, or remove errors. There is, therefore, no hope of greater advancement and improvement, unless in some reconstruction of the sciences.

But the commencement of this must be altogether taken from natural history, and that too of a new kind, and on a new scale. For it would be vain to smooth the mirror, if there were no images to reflect; and it is plain that suitable materials must be prepared for the understanding as well as steady supports. But our history also, like our logic, differs from the one generally received in many respects: in its end or office; in its material and compilation; in its minuteness; in its selection; and in its arrangement relatively to what follows.

For, in the first place, we set forth such a natural history as may not so much amuse by the variety of its topics, or delight by the immediate results of its experiments, as throw light upon the discovery of causes, and yield the first nutriment to philosophy. For, although we have principally in view practical results, and the active part of the sciences, yet we wait for the time of harvest, nor do we attempt to reap moss and an unripe crop. For we are convinced that general laws properly established, draw whole crowds of effects with them, and exhibit results, not scantily, but plentifully. But we wholly condemn and reject that unseasonable and childish eagerness of hastily seizing some pledges of new results, which, like the apple of Atalanta, only retard our course. And such is the office of our history.

But, as to its compilation, we compose a history of the operations of nature, not merely when she is free and unconstrained (when, that is to say, she proceeds and performs her works spontaneously, such as is a history of the heavenly bodies, of meteors, of the earth and the sea, of minerals,



plants, and animals), but much rather of nature constrained and vexed, that is, when, by the art and agency of man she is thrust down from her existing state, and forced and fashioned. Accordingly, we detail all the experiments of the mechanical arts, and of the operative parts of the liberal arts, and all of the various practical methods which have not been combined into any particular art (so far as it has been possible for us to inquire into them, and so far as they suit our purpose). Nay more, (to speak the truth) totally disregarding the pride of man and showy appearances, we both bestow much more labour upon this branch, and reckon it a much greater assistance than the other; since the nature of things discloses itself much more by the operations of art than when in perfect liberty.

Nor do we present the history of bodies alone, but we have thought this further task a fit exercise of our industry, to compile a separate history of properties themselves (those, I mean, which may be considered, as it were, the cardinal properties of natural things, and of which the elements of nature are plainly composed as matter of certain primary passions and desires, such as density, rarity, heat, cold, solidity, fluidity, weight, lightness, and many others).

And now, with regard to its minuteness, we plainly collect a much more delicate and simple kind of experiments than those which obviously present themselves. For we draw forth and extract from darkness many things which it would have occurred to no one to investigate, unless he were proceeding by a determinate and steady path to the discovery of causes, being of themselves of no great use, so that it is clear that they were not sought for their own sake, but that they bear the same relation to things and effects that the letters of the alphabet do to discourse and words, which, though useless in themselves, are still the elements of all language.

But, in the selection of our reports and experiments, we consider that we have used more caution for mankind than our predecessors in the subject of natural history. For we admit nothing, unless on ocular or, at the least, thoroughly approved testimony, and after the most rigorous examination; so that nothing will be found exaggerated into a miracle, but everything we relate will be pure and unadulterated by fables and falsehood. Nay more, the commonly received and repeated falsehoods (which by some extraordinary neglect have obtained currency for many ages, and become inveterate) we specifically censure and brand, that they may not any longer be troublesome to the sciences. For, as some one has wisely remarked, that the tales, and superstitions, and nonsense which nurses instil into children seriously corrupt their minds; so the same consideration has induced us to be cautious and even anxious from the first, lest, while we were managing and tending the infancy of philosophy in the department of natural history, it should become accustomed to any absurdity. But in every new and rather delicate experiment, although it may appear to us sure and satisfactory, we yet clearly subjoin the mode of experimentation which we have employed, in order that, the method being disclosed by which every thing was manifested to us, mankind may see whether there could be any lurking and inherent errors, and may rouse themselves to seek for proofs of a more trustworthy and refined nature (if there be any such). Lastly, we every where intersperse admonitions, and doubts, and cautions, casting out and keeping at a distance all phantoms by a sort of religious ceremony, and as if by an exorcism. Finally, since it is well known to us how much experience and history distract the powers of the human mind, and how difficult it is, especially in the case of understandings that are young or prepossessed, to become at first familiar with nature, we fre-

quently add some observations of our own, shewing, as it were, the first tendencies, and inclinations, and glances of history towards philosophy, as a pledge to assure mankind that they shall not always be detained in the ocean of history, and that all things may be in a better state of preparation when we have arrived at the work of the understanding. And by a natural history, such as this we are describing, we think that a safe and convenient access is afforded to nature, and sound and well-prepared materials to the understanding.

BUT, after we have guarded the understanding with the surest helps and protections, and mustered with most rigorous levy a complete host of divine works, it would seem that nothing more remains but to attack philosophy itself. Yet, in a matter so arduous and doubtful, it appears requisite that something should be interposed, partly for the purpose of instruction, partly for present use.

Of these the first is, that some examples should be offered of investigation and discovery, exhibited in particular subjects, according to our method and mode of proceeding; choosing especially the most dignified subjects of our inquiry, and such as differ most from each other, so that we may have an example in every branch. Nor are we speaking of those examples which are added to particular precepts and rules by way of illustration (for we have furnished these abundantly in the second part of our work), but we mean actual types and models, to place, as it were, before our eyes the whole process of the mind, and the continuous frame and order of discovery in particular subjects, chosen for their variety and importance. For we remembered that in mathematics, with the diagram before us, the demonstration followed easily and clearly: that, on the other hand, without this advantage, every thing appeared intricate and more difficult than it really was. To examples

of this kind, accordingly, we devote the Fourth Part of our work, which, in fact, is nothing more than a particular and expanded application of the Second Part.

BUT the Fifth Part is only introduced for a temporary purpose, until what remains can be finished, and is paid as interest until the principal can be raised. For we do not seek our object so blindly as to neglect anything useful which may present itself on the way. We compose the Fifth Part, therefore, of whatsoever things we have either discovered, or proved, or added, and that not exclusively by our own methods and rules of interpretation, but by the same exercise of our understanding that others are wont to employ in their investigations and discoveries. For, from our constant intercourse with Nature, we not only hope for greater results from our studies than the strength of our genius would seem to warrant, but also such results as have been mentioned may serve as inns upon the road, that the mind, while travelling to more certain objects, may rest awhile in them. But meanwhile we protest that we do not at all wish to be held bound by such conclusions, inasmuch as they have not been discovered or proved by the genuine form of interpretation. But there is no reason that any one should be alarmed at such suspense of judgment in our system, which does not assert absolutely that nothing can be known, but that nothing can be known unless in a certain order and by a certain method, and in the mean time establishes some determinate degrees of certainty for immediate use and relief, until the mind can rest in the full explanation of causes. Nor were those schools of philosophers who held absolute scepticism, inferior to the others who usurped the license of dogmatizing. The former, however, did not provide helps for the senses and understanding, as we have done, but utterly abolished belief and authority,

which is a wholly different, nay, almost opposite way of proceeding.

FINALLY, the Sixth Part of our work (to which all the other parts are subservient and ancillary) discloses and propounds that philosophy which is reared and established by the genuine, pure, and strict method of investigation which we have already taught and prepared. But to perfect and conclude this last part is a thing both beyond our strength and beyond our hopes. We hope, indeed, to furnish no contemptible beginnings of it; the fortune of mankind will furnish the issue, and such an issue as men, in the present state of things, and of their minds, cannot easily, in imagination, comprehend or measure. For the object of our pursuit is not barely contemplative enjoyment, but, in truth, the interests and fortunes of mankind, and a complete mastery over works. For Man, the servant and interpreter of Nature, is limited in action and understanding by the observation he has made on the order of Nature, either by sense or mentally: further than this he has neither knowledge nor power. Neither can any strength loose or burst the chain of causes, nor is Nature to be overcome otherwise than by obeying her. These two aims, therefore, namely, human knowledge and human power, really coincide; and the failure of effects chiefly arises from the ignorance of causes. And everything depends upon this, that, never turning the mind's eye from things themselves, we should receive their images exactly as they exist.

And may God never permit us to give forth the dream of our imagination as a model of the world, but, rather, graciously vouchsafe to us the power of writing the revelation and true vision of the traces and impressions of the Creator upon his creatures.

Do thou then, O Father, who gavest the visible light as the first-fruits of creation, and who inspiredst the countenance of man with the light of the understanding, as the completion of thy works, protect and direct this work, which, proceeding from thy goodness, returneth to thy glory. Thou, when thou turnedst to look upon the works which thy hands had made, sawest that every thing was very good, and didst rest. But man, when he turned towards the works which his hands had made, saw that all was vanity and vexation of spirit, and had no rest. Wherefore, if we labour in thy works, thou wilt make us partakers of thy vision and of thy rest. We humbly pray that this resolution may be fixed in us, and that thou mayest be willing to endow the family of mankind with new gifts by our hands, and by the hands of others on whom thou shalt bestow the same mind.

## THE FIFTH BOOK

OF

# THE ADVANCEMENT OF LEARNING.

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### CHAPTER I.

DIVISION OF THE DOCTRINE CONCERNING THE USE AND OBJECTS OF THE FACULTIES OF THE HUMAN MIND, INTO LOGIC AND ETHICS. DIVISION OF LOGIC INTO THE ARTS OF INVENTION, JUDGMENT, RETENTION, AND COMMUNICATION.

THE doctrine concerning the Intellect, excellent King, and that concerning the Will, are, as it were, twins in birth. For purity of intellectual light and freedom of the will began together, and together perished. Nor does there exist in the universe of Nature so close a sympathy as that between the True and the Good. The more, therefore, ought it to put learned men to shame, if in knowledge they be as winged angels, but in their lusts as serpents crawling in the dust; bearing about with them a mind like a mirror, indeed, but one foully stained.

We now come to the doctrine respecting the use and objects of the faculties of the human mind. It comprises two parts, and those well known and generally received, Logic and Ethics; except that we have first detached Political Science, which is generally classed under the head of ethics, and erected it into a distinct system of doctrine

concerning man, collectively considered, or in his social relations; for here we treat only of man in his individual capacity. Logical Science treats of the understanding and reason; Ethical Science, of the will, appetites, and affections. The former produces determinations, the other actions. It is true, indeed, that in both departments, the judicial as well as executive, imagination acts the part of legate, or internuncio, or mutual agent; for sense hands over to imagination images of every kind, on which reason afterwards pronounces sentence; and reason, in turn, hands over to imagination such images as have been chosen and approved of, before the determination is put into execution. For imagination always precedes voluntary motion, and stimulates it; so that imagination is an instrument common to both faculties, the reason and the will; saving that, like Janus, it presents two faces; for the face directed towards reason wears the likeness of truth, but the face towards action, the likeness of good, which nevertheless are

“Such faces as to sisters should belong.”

Nor, indeed, is the imagination simply and solely an internuncio; but, besides the mere office of conveying the message, it is either invested with, or usurps, no small authority. For it is well observed by Aristotle: “That the mind has over the body that command which a master has over a slave; but reason over the imagination that command which a magistrate in a free state has over a citizen,” upon whom, in his turn, the government may devolve. For we see that, in matters of faith and religion, the imagination mounts and is exalted above reason; not that the divine enlightenment has its place in the imagination (it has it rather in the very stronghold of the understanding and intellect), but as the divine grace in the virtues employs the motions of the will, in like manner in enlightenments it employs the motions of

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the imagination; hence it is that religion has always sought for itself a passage and entrance to the mind by similitudes, types, parables, visions, dreams. Again, the imagination possesses no little influence in persuasions insinuated by force of eloquence. For when, by the arts of oratory, men's minds are soothed, inflamed, and forcibly hurried away in any direction, this entirely arises from the excitement of the imagination, which, now becoming incontrollable, not only triumphs over reason, but, in some degree, does violence to it, partly by blinding, partly by stimulating it. Yet there seems not reason for abandoning our original division, for imagination scarcely produces any science; for as to poetry (which from the very first has been ascribed to the imagination), it is to be regarded rather in the light of a sportive exercise of the understanding, than as a science. But the power of imagination in things natural we have already discussed under the doctrine concerning the soul, but the connexion it has with Rhetoric we must refer to that art, of which we shall treat hereafter.

The part of Human Philosophy which comes under the head of Logic is the least agreeable to the taste and palate of most understandings, and seems to them nothing else than a net and snare of perplexing subtlety. For as it is truly said that knowledge is the food of the mind, so, in their choice and preference of this food, most have a palate like that of the Israelites in the wilderness, who were seized with a desire of returning to the flesh-pots, and loathed the manna, which, though food from heaven, was thought to be less pleasant and palatable. In the same way those sciences are most generally acceptable, which have some more savoury relish of flesh, such as civil history, morality, politics, about which men's affections, praises, and fortunes, turn and are conversant. But this "dry light" offends and parches the soft and watery understandings of the great ma-

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jority. But if we would estimate things by their intrinsic worth, the rational sciences are, without doubt, the keys of all the rest; and as the hand is the instrument of instruments, and the mind the form of forms, so these also are to be reckoned the arts of arts. Nor do they only direct, they also strengthen: as the use and practice of archery not only enable one to take a better aim, but also to draw a stronger bow.

The Logical Arts are four, distinguished according to the ends to which they are directed. For man's object in intellectual matters is either to discover what he seeks, or to judge what he has discovered, or to retain what he has judged, or to communicate what he has retained. There must then, of necessity, be the same number of intellectual arts: the art of inquiry, or invention; the art of examination, or judgment; the art of retention, or memory; and the art of expression, or communication. Of these we shall treat in detail.

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## CHAPTER II.

DIVISION OF THE INVENTIVE ART INTO THE INVENTION OF ARTS AND ARGUMENTS, AND THE FIRST OF THESE (WHICH IS THE MORE IMPORTANT) PROVED TO BE A DESIDERATUM. DIVISION OF THE INVENTION OF ARTS INTO METHODIZED EXPERIENCE AND THE NOVUM ORGANUM. A DESCRIPTION OF METHODIZED EXPERIENCE.

INVENTION is of two kinds, widely differing from each other: the one of arts and sciences, the other of arguments and discourses. The former of these I declare to be wholly wanting; a want which seems to me as complete as if, in making an inventory of the effects of a deceased person, the state-

ment made were, that there was no ready money. For as all other commodities are procured by money, so by this art all others are acquired. And as the West Indies would never have been discovered without the previous knowledge of the mariner's compass, though these regions are immense and the motion of the needle small, so no one should think it strange that further progress has not been made in the investigation and advancement of the sciences, since the very art itself of discovering and investigating the sciences has been hitherto unknown.

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That this department of knowledge is wanting is clearly an admitted fact; for, in the first place, Logic does not profess, nay, it does not even contemplate the inventing of arts, either mechanical or liberal (as they are called); or even the eliciting of the operative methods of the former, or general laws of the latter; but in a passing way addresses mankind, and dismisses them with the charge, "that they should believe every one in his own art." Celsus, a man of sagacity, and not a mere physician (though it is usual for all men to break out into commendations of their own profession), when speaking of the empirical and dogmatic sects of physicians, makes a weighty and frank acknowledgment, "that medicines and cures were first found out, and their causes and reasons afterwards investigated; and not, conversely, causes first elicited from the nature of things, and then employed as lights for the discovery of remedies." And Plato more than once remarks, "that particulars are endless, while, on the other hand, the highest generalities offer less satisfactory proofs; and that, therefore, the pith of all the sciences, whereby the scientific man is distinguished from the inexpert, rests in the middle propositions, which, in each particular science, experience has transmitted and taught." Nay, also, those who have treated of the first inventors and origins of the sciences, have celebrated chance, rather than art; and (1)

The first arts were invented among the Egyptians  
They were accustomed to deify their inventors  
They sacrificed brutes  
Brutes were the Inventors of arts.

(2) have introduced as their inventors the brute creation, beasts, birds, fishes, serpents, rather than men :

“ A branch of healing dittany she brought,  
Which in the Cretan fields with care she sought;  
Rough is the stem, which woolly leaves surround,  
The leaves with flowers, the flowers with purple crowned;  
Well known to wounded goats—a sure relief,  
To draw the pointed steel, and ease the grief.”

So that it is not at all surprising (it being usual among the ancients to deify the inventors of useful things) that the Egyptians, an ancient nation (to whom most of the arts owe their rise), had their temples full of the images of brutes, and scarcely any human idols :

“ They worship gods of every monstrous shape,  
The bull, the dog, the ibis, and the ape;  
And set these horrid deities above  
The lovely progeny of mighty Jove.”

But should you prefer, according to Grecian tradition, to ascribe the arts rather to men as their inventors, yet you would scarcely say that Prometheus employed meditation for the discovery of fire, or that when he first struck the flint he expected a spark ; but rather that he accidentally hit upon it, and (as they say) stole it from Jupiter. So that, as far as concerns the discovery of the arts, we are more indebted to the wild-goat for plasters, to the nightingale for musical airs, to the ibis for purgatives, to the pot-lid that flew open for artillery,—lastly (to express it in one word), to chance or anything else rather than to Logic. Nor, indeed, is that method of invention so well described by Virgil of a different kind:—

(3) “ That old experience pondering on its store,  
And turning all its treasures o’er and o’er,  
By slow degrees should gain invention’s part,  
And work its way to new and wondrous art,”—

for no other plan of discovery is here set forth than that of which brutes themselves are capable, and which they frequently employ, that is to say, a most sedulous attention to one thing, and a constant practising of it, which the necessity of self-preservation imposes on such animals. For Cicero very truly observes: "Experience devoted to one subject often overcomes both nature and art." Wherefore if it be said of men—

"Stern labour all subdues,  
And ceaseless toil that urging want pursues;"

it is likewise asked of brutes—

"Who taught the parrot it's 'good morrow'?"

Who taught the raven, in a time of great drought, to throw pebbles into a hollow tree where she happened to see water, so as to enable her to reach with her beak the rising fluid? Who instructed the bees, who are in the habit of traversing the air, like a boundless sea, in quest of flowery fields, though far removed from their hives, and yet return home again? Who taught the ants to nibble every grain of corn when depositing it in their hillock, lest, after storing, it might take root and disappoint their hope? But if in that line of Virgil we mark the strict meaning of the term *extundere* (to work out), which imports the difficulty of the thing, and of *paulatim* (by slow degrees), which implies its slowness, we shall return to what we set out from, namely, those gods of the Egyptians; since hitherto men have used but little the faculty of reason, and not at all the office of art, for the purposes of invention.

Secondly, the statement which we make (if we consider the matter attentively) is proved by the form of induction which the old Logic propounds, whereby the principles of the sciences may be discovered and proved, which is utterly

*The extract from flowers = the facts.  
The bee = the mind.  
The Honey = the form.*

faulty and inadequate, and is so far from perfecting nature, that it rather perverts and distorts it. For he who shall narrowly examine the way of collecting the ethereal dew of the sciences, like that of which the poet speaks,—

“Honey from heaven distill’d, the Gods’ own gift,”

(for the sciences are extracted from single examples, some natural, some artificial, as from the flowers of the field and garden),—he shall find (I say) that the mind spontaneously, and by its natural bent, completes a more scientific induction than that described by the logicians; for it is faulty to draw a conclusion from a bare enumeration of particulars, wherein is not found an opposing instance (as is usual with the logicians): nor does an induction of this kind give rise to anything more than a probable conjecture. For who will take on him to say, when the particulars which he knows or which he remembers appear only on one side, that something does not escape notice which is wholly opposite? Just as if Samuel had rested satisfied with those sons of Jesse whom he saw brought before him in the house, and made no inquiries for David who was absent in the field. And this form of induction (if the truth must be plainly told) is so coarse and gross, that it would seem inconceivable that such acute and subtle understandings as have been employed on these matters could have obtruded it on the world, were not this the cause, that they were pushing forward with precipitate eagerness to the establishment of theories and systems, but despised particulars (especially any long delay upon them) from haughtiness and arrogance of mind. For they employed examples on particular instances, as lictors or officers to keep off the crowd, in order that they might open a way for their systems; but they would by no means admit them into counsel from the very beginning, for the purpose of making a genuine

*\* Experiment  
° Observation*

and well-matured deliberation on the truth of things. Surely the mind must be struck with feelings of pious and holy wonder, when we see the same track seducing into error both in divine and human things. For as, in the acquisition of divine truth, one can hardly persuade himself to become, as it were, a little child; so, in the pursuit of natural knowledge, it is reputed a mean and contemptible proceeding for those in any degree advanced to condescend, like children, to trace again and re-examine the first elements of inductions.

Thirdly, even though we should admit that the general principles of the sciences may be rightly established by the induction in common use, or by sense and experience; yet it is most certain that the inferior axioms cannot be correctly and safely deduced from them by the syllogism in the physical sciences which are related to matter. (For, in the syllogism, the reduction of propositions to principles is made by middle propositions. Now this form of discovery or of proof may have place in the popular sciences (such as Ethics, Politics, Law, and the like); nay, also in Theology, since it may have pleased God in his goodness to descend to the level of the human capacity; but in the physical sciences, wherein nature is to be fettered by labour, not an opponent by disputation, truth evidently escapes out of our hands, because the subtilty of natural operations is far greater than that of words: so that, syllogism failing, there is everywhere need of the office of induction (that is to say, the genuine and amended induction), for establishing not only the more general principles, but also the inferior propositions.) For syllogisms consist of propositions, propositions of words, and words are the symbols of notions. Wherefore if notions themselves (which are the vital principles of words) are defectively and unsteadily abstracted from things, the whole fabric falls to the ground. Nor can a laborious examina-

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tion of the consequences of arguments, or of the truth of propositions, ever set the matter right; the error being (to use a medical phrase) in the first digestion, which is not corrected by the after processes. It was not, therefore, without great and manifest reason that several of the philosophers (and some of them, too, of the greatest note) became Academics and Sceptics, who denied the certainty of human knowledge and comprehension, declaring that it could not extend beyond likelihood or probability. I do not deny that Socrates, when disavowing any claim to certain knowledge, was thought by many to do so only in irony; and that he only affected knowledge by this disavowal; by disowning, it seems, acquaintance with things which he evidently knew, that he might thereby earn the character of knowing what he was ignorant of. Nor in the later Academy (which Cicero embraced) was that opinion of Acatalepsy held with much sincerity. For those who excelled in eloquence usually adopted this system, that they might attain the glory of arguing copiously on both sides: thus deviating from the direct path along which they should have proceeded to truth, to some pleasant excursions, as it were, undertaken for amusement. Yet it must be admitted that some in both Academies (the old and new), and much more among the Sceptics, held that doctrine of Acatalepsy in sincerity and integrity. But in this lay their chief error, that they falsely charged the perceptions of the senses; by doing which they tore up the sciences by the roots. But the senses, though they may often either deceive or fail us, yet, when aided with much care, can afford a sufficient basis for real science; and that not so much by the help of instruments (though these also may in some degree be of service), as of experiments of such a kind as may enlarge objects too subtile for the senses, into objects capable of being apprehended by them. But they ought rather to have ascribed



their failure in this respect to errors of judgment and to obstinacy (which refuses to yield obedience to nature itself), and to faulty demonstrations, and ill-devised modes of reasoning and of drawing conclusions from the perceptions of the senses. And we make these remarks not to depreciate the powers of the understanding, or to cause the whole undertaking to be abandoned, but in order that suitable aids may be procured and supplied to the understanding, to enable men to overcome the difficulties of things and the obscurity of nature. For no one can by any steadiness, or even practice of hand, acquire the power of drawing a straight line, or describing a perfect circle, wholly unassisted by art; which yet is quite easy to do by aid of a rule or compass. This, then, is the very thing we are engaged about, and with all possible pains endeavouring to effect, namely, that the mind may by art be made a match for Nature; and that there may be found some art of discovery and direction which may disclose other arts, with their axioms and operations, and place them before our eyes. For this art we have with reason pronounced a desideratum.

This art of direction (for so we shall call it) has two parts: for the direction proceeds either from experiments to experiments, or from experiments to axioms, which may again point out new experiments. The former of these we shall call Methodized Experience; and the latter, the Interpretation of Nature, or the *Novum Organum*. The former, indeed, (as we have elsewhere hinted) is hardly to be considered as an art or branch of philosophy, but rather as a kind of sagacity; for which reason we also occasionally denominate it the Chase of Pan (borrowing this name from the fable): yet, as any one can proceed on a journey in a three-fold manner, either by groping by himself in the dark; or by the guidance of another's hand, himself seeing imperfectly; or, lastly, by directing his steps with the aid of

a light: in the same way, when one tries experiments of every kind, without any plan or method, that is nothing but groping; when he employs some system of direction and order in making experiments, it is just as if he were led by the hand,—and this is what we mean by Methodized Experience; for the light itself, which was the third thing mentioned, is to be derived from the Interpretation of Nature, or the *Novum Organum*.

Methodized Experience, or the Chase of Pan, treats of the ways of making experiments. As we have pronounced it a desideratum, and as its nature is not obvious, we shall, agreeably with our custom and plan, give a slight sketch of it. The method of making experiments proceeds chiefly either by variation of the experiment; or by production of the experiment; or by transference of the experiment; or by inversion of the experiment; or by compulsion of the experiment; or by application of the experiment; or by conjunction of the experiment; or, lastly, by chance experiments. But all these stop short of the discovery of a general law. For that other part concerning the *Novum Organum*, claims, as belonging to its province, every transition from experiments to general laws, or from general laws to experiments.

Variation of the Experiment is made first in the subject: for instance, when an experiment has been hitherto confined to a particular substance, and now is tried on others of a like kind; thus the making of paper has been hitherto tried with linen rags only, and not with silk, except, perhaps, among the Chinese. . . . . . We likewise place variation in the part of the thing among the variations in the subject. Thus we see that a scion grafted on the trunk of a tree thrives better than if set in earth; why, then, should not onion seed, set in a green onion, grow better than when sown in the ground by itself,

the root being here substituted for the trunk, so that there is, as it were, a grafting on the root? Secondly, Variation of the Experiment is made in the efficient. Thus, as the sun's rays are so concentrated by a burning-glass as to set fire to any highly combustible substance, may not the moon's rays, by the same means, be brought to some small degree of warmth, so as to shew whether all the heavenly bodies are potentially hot? . . . . .

Variation of the Experiment is made, thirdly, in quantity; and in this very great care is required, since in it we are subject to various errors. For it is commonly supposed, that on the increase of the quantity the efficacy should increase proportionably, and this is usually assumed as a mathematical certainty; and yet it is utterly false. Thus, suppose a leaden ball of a pound weight, let fall from the top of a tower, reaches the earth in ten seconds, will a ball of two pounds weight (in which the power of natural motion, as they call it, should be double) reach it in five? No, they will fall in about equal times, their velocity being by no means in proportion to their weight. . . . .

In such matters men should remember how Æsop's housewife was deceived, who expected that, when doubly fed, her hen should lay two eggs a day, whereas the hen grew fat and laid none. It is absolutely unsafe to rely upon any natural experiment, unless proof be made of it both in a less and a greater quantity. And so much for Variation of the Experiment.

Production of the Experiment is twofold, Repetition and Extension, the experiment being either repeated or pushed to greater nicety. The following will serve for an example of Repetition. Spirit of wine is made from wine by simple distillation, and is much stronger than wine itself; will likewise spirit of wine proportionally exceed itself in

strength after another distillation? But the Repetition also of Experiment is liable to fallacy; for, in the first place, the second increase of effect does not equal the first; and again, it is often found that nature, after having reached a certain point, on the repetition of the experiment, so far from progressing, rather retrogrades. Judgment, therefore, must be used in this matter. . . . .

For an example of Extension: the loadstone attracts iron in the mass; but, quære, if plunged into a solution of iron, will it attract the iron, and cover itself with it? . . . . .

Transference of the Experiment is threefold: first, from nature or chance into art; secondly, from one art or practice into another; and, thirdly, from one department of an art into a different department of the same. There are innumerable examples of the transference of experiments from nature or chance into art; so that in fact almost all the mechanical arts owe their origin to slender beginnings afforded by nature or accident. It was always a familiar proverb, "that grapes among grapes ripen sooner." And our cider-makers observe this rule, for they do not press their apples, until they have been laid in heaps for a time, to ripen by mutual contact, a process which corrects the tartness of the liquor. . . . .

If mankind were really earnest in searching after useful inventions, they ought attentively, minutely, and systematically to examine the workmanship of nature, and her several operations, and should be continually and diligently examining which of them may be transferred into the arts. For nature is the mirror of art. Nor are the experiments fewer, which admit of being transferred from one art or practice into another; although this is but rarely used, for nature is everywhere open to the observation of all, but the several arts are known only to those who practise them.

Spectacles were invented to help weak sight: might not some instrument be discovered which, applied to the ears, should improve the hearing? . . . . .

It may be observed in general, that nothing would be of greater efficacy in producing an abundant stock of new and useful inventions, than that the experiments of several mechanical arts should be known to a single person, or to a few who might mutually improve each other by conversation, so that, by this transference of experiments, as we call it, the arts might mutually foster, and, as it were, light up each other by an intermixture of rays. For although the Rational Method, by means of our Organum, promises much greater things, yet this sagacity which is employed in the way of Methodized Experience, will, in the meantime, scatter abroad among mankind (like the donatives anciently thrown among the populace) many results of a more obvious kind. There remains the sort of transference from one department of an art into a different department of the same, which does not differ much from the transference from art to art; however, since some arts are so extensive as to admit of a transference of experiments within themselves, we have thought proper to notice this kind of transference also, especially as it is of great importance in some particular arts. Thus, it would greatly contribute to the enlargement of the medical art, if experiments were transferred from that part of it which treats of the remedies of diseases to those branches which relate to the preservation of health and the prolongation of life. . . . .

An Experiment is Inverted when the contrary of what the experiment shews is tried; for example, heat is increased by burning-glasses; quære, will cold be so too? . .

Compulsion of the Experiment is made, when the Experiment is pushed and continued to the annihilation of the

power. For in other chases the game is only caught, but in this it is killed. The following will serve for an instance. . .

The magnet attracts iron through all known media, gold, silver, glass, &c.; try, and, if possible, find one that intercepts the magnetic power. On Compulsion of the Experiment, we do not dwell at any length at present, because for the most part it falls without the limits of Methodized Experience, and has to do rather with causes and axioms, and the Novum Organum. For wherever a negation or exclusion appears, some guidance begins to be afforded us towards the discovery of laws.

Application of the Experiment is nothing else than an ingenious transference of it to some other useful experiment. For example: every body has its own dimensions and specific gravity; gold is heavier in proportion to its bulk than silver, water than wine; hence an useful experiment is derived for discovering what proportion of silver is mixed with gold, or of water with wine, which was the celebrated Eureka of Archimedes. . . . . . Instances of this kind are endless. Let men be but on the watch, and have their eyes continually turned, one while to the nature of things, and another while to the uses of man.

Conjunction of the Experiment is a connected chain of applications, when things which, taken singly, would have been of no value, are made useful by combination. Thus, ice and nitre, when separate, have great cooling powers, but, when mixed together, much greater. Yet there may often be a fallacy in this, as in all cases where axioms are wanting, if the conjunction be made of things which operate in different and conflicting ways.

Chance Experiments remain to be considered. But this way of making experiments is obviously an irrational and wild procedure; when it enters one's thoughts to attempt any experiment, not because reason, or some other experi-

ment, suggests it, but only because nothing of the like kind was ever tried before. Yet I do not know but that something of importance may lie hid in this procedure which we are now discussing; provided no stone in nature be left unturned. For the great secrets of nature usually lie beyond the beaten paths and common tracks, so that even the apparent absurdness of a thing occasionally proves useful. But if reason be joined, that is, if it be evident that a like experiment was never tried before, and yet there be strong grounds for making it; then this method is excellent, and thoroughly ransacks the mysteries of nature. For instance, in the operation of fire upon a natural body, one of these two things has always happened hitherto, that either something flies off, as flame and smoke in our common fires, or at least that the parts are locally separated to some distance, as in distillation, where the vapour rises, leaving a residuum behind. But no one has tried close distillation (for so we may call it). And yet it seems probable, that if the force of heat had its action confined within the limits of a body, and the body were not allowed to escape, this Proteus matter would be, as it were, manacled, and forced to undergo numerous transformations, provided only the heat were so moderated and gradually altered, as not to break the containing vessel. . . . And so much for Chance Experiments.

Meantime, with respect to these experimental methods, we advise that no one despond or be confounded, if the experiments he attempts should not answer his expectation. For though what succeeds gives the greater pleasure, yet what fails often gives no less information. And it must always be remembered, that light-bearing experiments are to be sought even more than fruit-bearing; a maxim, the importance of which we are constantly insisting on. And thus far of Methodized Experience, which, as we have already said, is rather a sort of sagacity and a scenting out of

nature than science. But the *Novum Organum* we leave for the present untouched, intending (under the divine blessing) to write a separate treatise on that most important subject.

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### CHAPTER III.

DIVISION OF THE ART OF INVENTING ARGUMENTS INTO PROMPTUARY AND TOPIC. DIVISION OF TOPIC INTO GENERAL AND PARTICULAR. EXAMPLE OF TOPIC PARTICULAR IN THE INQUIRY INTO GRAVITY AND LIGHTNESS.

THE invention of arguments is not invention, properly so called, for to invent is to discover what is unknown, not to regain or recall what is already known. But the use and office of the invention here spoken of seems nothing else than, out of the stock of knowledge which has been collected and stored up in the mind, to draw forth dexterously what may be pertinent to the subject or inquiry proposed. For topics of invention are of no use to one who knows little or nothing respecting the subject under consideration; on the other hand, one who has in his possession, ready prepared, what may be brought forward upon the question in hand, can, even without the rules of art and topics of invention, find and bring forward arguments, though not so promptly and conveniently; so that this kind of invention (as we have already remarked) is not invention, properly so called, but only a recollection, or a suggestion with application. However, since the appellation has come into use, and has been generally received, it may doubtless be called invention, since we can apply the expressions *chasing* and *catching* to game not less when hunted within an enclosed park, than when in open grounds. But, giving over verbal cavils, this may be laid down: that the scope and

*force of the name?  
There cannot be a  
science of science  
& there must be  
a topic.*



aim of this matter is to attain a prompt and ready employment of our knowledge, rather than an enlargement or increase of it.

And a two-fold plan may be adopted in order to our having a store ready for argument. Either to have marked and pointed out as it were by the finger, on what heads we should investigate a matter; and this is what we mean by Topic. Or, to have arguments ready composed and stored up for use on subjects which more frequently occur and come under discussion; and this we shall denominate Promptuary. But this latter hardly deserves the name of science, as consisting rather of diligent preparation than of any scientifically-constructed body of knowledge. But in this department Aristotle ingeniously, though mischievously, derides the Sophists of his day, remarking, "that they acted like one who, professing the art of shoe-making, would not teach the way of making a shoe, but merely exhibit several shoes of different shapes and sizes." Yet here one might retort, that a shoe-maker who had no shoes in his shop, and who would not make them unless when ordered, would certainly continue poor, and find but few purchasers. But our Saviour, when speaking of divine knowledge, expresses himself very differently: "Every scribe which is instructed unto the kingdom of heaven, is like unto a man that is an householder, which bringeth forth out of his treasure things new and old." We see also that the ancient professors of rhetoric instructed orators to have in readiness various commonplaces, furnished beforehand, and treated and embellished on both sides of a question; for instance, for the intention of a law against the letter of it, and *vice versa*; for the credit of arguments against that of evidence, and *vice versa*. But Cicero himself, taught by long experience, plainly declares that a diligent and attentive orator can have all matters that could become subjects of discussion preme-

*de quibus partes =* } *on what heads we should* <sup>or</sup> *on what you want*  
*in what direction to institute your inquiries*  
*as to quantity, quality &c*

*Aristotle refers to*  
*the apprentice.*  
*Refer to the*  
*customer.*

dictated and worked out, so that in the pleading of the cause it will not be necessary to introduce anything novel or extemporaneous, except new names and some particular circumstances. But the industry and care of Demosthenes went so far, that, considering how much influence the first opening and introduction of a cause had in prepossessing the minds of the audience, he thought it useful to compose and have in readiness several prefaces of speeches and orations. And these examples and authorities should justly outweigh the opinion of Aristotle, who would recommend us to exchange a wardrobe for a pair of shears. Accordingly this department of study, which we have called Promptuary, should not be omitted; but we have said enough of it for the present; for as it is common to both Logic and Rhetoric, I thought fit to give it merely a cursory review here under the head of Logic, postponing the fuller handling of it until we come to speak of Rhetoric.

The other branch of the inventive art, namely, Topic, we shall divide into General and Particular. The General is what has been industriously and fully treated of under Dialectics, so that it is unnecessary to spend time in the explanation of it. But I may give this passing hint, that this Topic is useful, not merely in discussions in which we engage with others, but also in our meditations, when we are reflecting or deliberating on any matter by ourselves. Nor are the advantages of it confined to merely suggesting or admonishing what affirmation or assertion we should make; it likewise suggests our inquiries or interrogations. But a skilful interrogation is, as it were, half knowledge. For Plato well observes: "He who searches for anything has a sort of general conception of the object of his search, otherwise how possibly could he recognise it when discovered?" Accordingly, the more comprehensive and definite our anticipation is, the more direct and compendious will be our

search. Those same topics, therefore, which will be serviceable in ransacking the recesses of our own intellect, and drawing forth the knowledge stored up there, will also aid us in deriving knowledge from external sources, so that if any one be present who is experienced and a proficient in a matter, he can be suitably and skilfully questioned on it by us; and in like manner, authors and books, and parts of books, which may instruct and give us information on the subjects we are investigating, can be advantageously chosen and studied.

But the Topic Particular<sup>\*</sup> is far more conducive to the objects we speak of, and ought to be considered most serviceable. Some slight notice has, indeed, been taken of it by a few writers, but it has not been treated of as a whole, or as its importance would require. But, discarding that faulty principle and arrogant spirit which have too long reigned in the schools, namely, of pursuing with endless subtilty such things as are obvious, and not so much as touching upon those which are a little more remote; we, for our own part, embrace, as a most useful aid, the Topic Particular, that is to say, commonplaces of inquiry and discovery appropriated to particular subjects and sciences. But these are compounded of Logic and the special subject-matter of each science. For he is evidently silly and narrow-minded, who imagines that there could be devised and set forth an art for the discovery of sciences, finished from the very first, and that ever after we need only use and exercise it. But men may rest satisfied that substantial and genuine arts of discovery grow and are enlarged with the progress of discovery, so that when one first enters on the investigation of any science, he may have a few useful rules of discovery, but after making further progress in the science, he is both able, and he ought, to devise new rules of invention, that may conduct him more successfully to further discoveries.

\* the ars generalis

The more I know  
ledge you have  
the more enson  
y is suggested  
to you.

This procedure resembles a journey on level ground; for when we have travelled part of the way, we have not only gained the advantage of approaching nearer to our journey's end, but we also get a better view of the remainder of our route. In the same manner, in the sciences, each step of our progress, while advancing beyond what is left behind, also brings nearer into view whatever remains. But I have thought good to subjoin an example of this Topic, as we class it among the desiderata.

[Here follows

EXAMPLE OF TOPIC PARTICULAR, OR HEADS OF INQUIRY CONCERNING WEIGHT AND LIGHTNESS . . . . .]

We again repeat the warning we have already given, which is, that men should vary their particular topics, so that, after making greater progress in inquiry, men should commence different topical investigations, one after the other, if they have a mind to ascend the heights of the sciences. But we think so highly of particular topics, that we have it in contemplation to complete a special work upon them in natural subjects of a more interesting and obscure character. For we are masters of questions, but not equally so of things.

## CHAPTER IV.

DIVISION OF THE ART OF JUDGMENT INTO JUDGMENT BY INDUCTION AND BY SYLLOGISM, THE FORMER OF WHICH IS CONNECTED WITH THE NOVUM ORGANUM. THE FIRST DIVISION OF JUDGMENT BY SYLLOGISM INTO REDUCTION DIRECT AND INVERSE; SECOND DIVISION OF IT INTO ANALYTICS, AND THE DOCTRINE OF REFUTATIONS. DIVISION OF THE DOCTRINE OF REFUTATIONS INTO REFUTATIONS OF SOPHISMS, REFUTATIONS OF INTERPRETATION, REFUTATIONS OF IMAGES OR IDOLS. DIVISION OF IDOLS INTO IDOLS OF THE TRIBE, IDOLS OF THE CAVE, AND IDOLS OF THE FORUM. APPENDIX TO THE ART OF JUDGMENT, RESPECTING THE ADAPTATION OF DEMONSTRATIONS TO THE NATURE OF THE SUBJECT.

LET us now proceed to judgment, or the art of judging, the subject matter of which is the nature of proofs or demonstrations. Now in this art of judgment conclusions are arrived at either by induction or by syllogism (which is also the statement commonly received); for enthymemes and examples are merely abridgments of those two. But as to judgment arrived at by induction, we have no reason for dwelling on it, inasmuch as what is sought for is both discovered and judged of by one and the same operation of the mind. For the matter is not accomplished by means of any intermediate step, but directly, almost in the same way as in perceptions by the senses. For sense, in its primary objects, by the same act apprehends the notion of the object, and assents to the truth of it. But the case is different in syllogism, where the proof is not direct, but is arrived at by a medium. Accordingly, the discovery of a middle term is one operation, the judgment respecting the cogency of the argument another. For the mind first casts about, and afterwards acquiesces. But the corrupt form of induction we totally discard, the genuine we refer to the Novum Organum. On judgment by induction we have said enough here.

Respecting the other mode of judging, I mean that by syllogism, why need I speak, it being a subject that has been fine-polished by the keen edge of the subtlest intellects, and wrought to extreme nicety? And no wonder that it should, for it has a strong sympathy with the human understanding. For the mind of man, to a surprising degree, strains and pants after this, that it may not remain in suspense, but may attain some fixed and immoveable footing, on which, as on a support, it may rest in its wanderings and inquiries. And exactly as Aristotle labours to prove that in all motion of bodies there is found some point quiescent, and very elegantly applies the old fable of Atlas (who, himself in a fixed position, supported the heavens on his shoulders), to the poles of the world about which its revolution is performed: in the same way with great eagerness men desire to have within themselves some Atlas or poles for their thoughts, that may in some degree regulate the fluctuations and giddy whirl of their understanding; being apprehensive, doubtless, lest their heaven may fall. Accordingly, they have precipitately hastened to establish principles of science, about which all the variety of disputes might turn without danger of ruin or fall; not reflecting, of course, that one who grasps at certainties too hastily, will end in doubts; while he who seasonably suspends his judgment will arrive at sure conclusions.

It is clear, then, that this art of judging by syllogism is nothing else than the reduction of propositions to principles by middle terms. But the principles are understood to be admitted by general consent, and are not subject to debate. But the discovery of middle terms is left to the unaided sagacity and inquiry of genius. Furthermore, that reduction is twofold, namely, direct and inverse. It is direct when the proposition is reduced to the principle; which is denominated ostensive proof. It is inverse, when the contradictory

of the proposition is reduced to the contradictory of the principle; which they call proof *ex absurdo*. But the number of middle terms, or the scale of them, is lessened or increased in proportion to the remoteness of the proposition from the principle. — *The ultimate major.*

Having stated these points, we shall now divide the art of judgment (as is ordinarily done) into the Analytic, and the Doctrine of Refutations: the one supplying direction, the other caution. For the Analytic lays down genuine forms respecting the cogency of arguments, from which if there be any variation or deviation, the conclusion is discovered to be vicious: and this contains within itself a kind of refutation or redargution. For what is straight (as the saying is) indicates both itself and what is crooked. It is, however, safest to employ refutations in the way of warning, to insure the more easy detection of fallacies, which would otherwise ensnare the judgment. But in the Analytic we discover no deficiency, nay, it is rather encumbered with superfluities than in need of additions.

The Doctrine of Refutations we would divide into three parts: the refutations of sophisms, the refutations of interpretation, and the refutations of images or idols.

The doctrine touching the Refutations of Sophisms is particularly useful; for although fallacies of the grosser kind are cleverly enough likened by Seneca to jugglers' tricks, in which, though unacquainted with the way of performance, we yet are satisfied that they are not as they appear to be, yet the more subtle sophisms not only are such that it is difficult to answer them, but they also seriously confound the judgment itself. The department relating to the refutations of sophisms has been ably treated of by Aristotle in the way of rules; by Plato better still in the way of examples; and that not only in the persons of the old Sophists

(such as Gorgias, Hippias, Protagoras, Euthydemus, and others), but also in the character of Socrates himself, who, systematically pursuing the course of affirming nothing, but invalidating the statements made by others, has most ingeniously described the various forms of objections, fallacies, and refutations. In this department, therefore, we find no deficiency. Let this, meanwhile, be observed, that, though we have placed the proper and principal use of this doctrine in the refutation of sophisms, yet it is quite clear there is a perverted and corrupted employment of it, which is directed to the forming and dressing up of cavils and contradictions by means of those same sophisms; a faculty which is considered excellent, and which is attended with no inconsiderable advantages, though some one has thus elegantly illustrated the distinction between the orator and the sophist: that the one, like the grey-hound, has the superiority in point of speed; the other, like the hare, in turning.

The Refutations of Interpretation come next to be considered, for so we shall call them (borrowing the term rather than the meaning from Aristotle). Let us, therefore, remind the reader of the remarks made by us on a former occasion (when treating of the Primary Philosophy) on the transcendental and adventitious conditions or adjuncts of beings. Of such are, Greater, Less; Much, Little; Prior, Posterior; Identity, Diversity; Potentiality, Act; Habit, Privation; Totality, Parts; Active, Passive; Motion, Rest; Existence, Non-existence; and such like. But let men particularly remember and notice the different views that may be taken of these things, as we have mentioned; namely, that they can be investigated either physically or logically. But the physical discussion of them we have assigned to Primary Philosophy. The logical treatment of them remains; and this is what we at present denomi-



nate the doctrine of the Refutations of Interpretation. This department of knowledge is unquestionably sound and useful. For those general and common notions are of such a nature as to present themselves every where in all disputes; so that, unless they are well distinguished from the very first, with care and watchful judgment, they will strangely darken and cloud the whole light of discussion, and almost bring the matter to such a state, that discussion will end in mere strifes about words. For equivocations and wrong acceptations of words (especially of this description) are the sophisms of sophisms. Wherefore also we have thought it better to give the discussion of them a separate consideration than to class it under the Primary Philosophy or Metaphysics; or to make it a part of Analytics, as Aristotle has done confusedly enough. But we have given it a name from its use, for its genuine use is obviously a refutation and caution respecting the employment of words. Nay, also, that department which relates to the predicaments, if it be rightly constructed, we think, is most serviceably employed in cautions about not confounding or disordering the terms of definitions and divisions, and we wish it to be classed under the present head.

But, with respect to the Refutations of Images and Idols: Idols are the deepest fallacies of the human mind; for they do not deceive in particular cases, as the others, by clouding and ensnaring the judgment, but altogether from a faulty and vicious predisposition of the mind, which distorts and corrupts, as it were, all the anticipations of the intellect. For the human mind, covered and darkened by the body, is so far from resembling a smooth, plane, and clear mirror (which receives and reflects the rays of objects without distortion), that, on the contrary, like a magic mirror, it is full of superstitious illusions and apparitions. But Idols are imposed on the understanding, either by the

general nature of mankind, or by the particular nature of each, or by words or communicative nature. The first class we have been accustomed to call Idols of the Tribe; the second, Idols of the Cave; the third, Idols of the Forum. There is also a fourth description, which we denominate Idols of the Theatre, and is superadded from false theories or systems of philosophy, and erroneous laws of demonstration; but this last class can be got rid of and removed, accordingly we will not dwell on it at present. But the others keep complete possession of the mind and cannot be wholly eradicated. No one, therefore, need expect any application of Analytics to them; but the Doctrine of Refutations is itself the primary doctrine relating to the Idols. And, if the truth must be told, the doctrine of Idols cannot be reduced to a system; all we can do is to exert a thoughtful prudence in guarding against them. But the copious and accurate discussion of them we dismiss to the Novum Organum; intending, merely, to make a few general observations on them in this place.

Let the following serve as an example of Idols of the Tribe. The nature of the human mind is more wrought upon by affirmative and active instances than by negative and private, though justly and fairly it ought to shew itself impartial to both. But if any event occurs and holds good, the mind receives a stronger impression from it than from a far greater number of failures or contrary occurrences. And this is the root of all superstition and silly credulity. He, therefore, wisely replied, who, on being pointed out in a temple a painting of those who had discharged their vows, for having escaped the dangers of shipwreck, and was pressed with the question, if he did not at length recognise Neptune's divine power? retorted by asking, but where is the painting of those who perished after making their vows? And the same account may be given of similar

superstitious notions that prevail about astrological predictions, dreams, omens, and the like. The second example is as follows: The human mind (as it is, in its own essence, equal and uniform) presupposes and fancies a greater equality and uniformity in universal nature than really exists. Hence the fiction of the mathematicians that all the heavenly bodies move in perfect circles, rejecting spiral lines; from this also we may account for the fact, that, though there are many things in nature singular and full of disproportion, yet the thoughts of man are constantly fancying relations, parallelisms, and correspondencies; hence has been introduced the element of fire, with its orb, to make up the square with the other three, earth, water, and air. The chemists, moreover, have arrayed a visionary army of the objects of the universe, by a most silly fiction imagining that there are found in their four elements (heaven, air, earth, and water), individual orders corresponding and proportional, respectively, one to the other. Our third example closely resembles the preceding one, that man makes himself the standard and mirror of the universe; and it is hardly credible (if every case were enumerated and noticed) what a host of Idols has been introduced into philosophy, by reducing the operations of nature to a resemblance of the actions of man, that is, by imagining that nature acts as man does. And such notions are not much superior to the heresy of the Anthropomorphites, which arose in the cells and solitude of stupid monks, or the Pagan opinion corresponding to this,—that of Epicurus,—which assigned human shape to the gods. But it was unnecessary for the Epicurean Velleius to ask, why God had decked the heaven with stars and lights, as if he were an Ædile? For if that supreme Architect had been disposed to act like an Ædile, he should have arranged the stars in some beautiful and elegant order,

(2)

(3)

resembling the highly finished ceilings of palaces; whereas, on the contrary, one can scarcely shew, in such an infinite number of stars, any square, triangular, or rectilinear figure. So great is the disproportion between the spirit of man and the spirit of the universe.

As to the Idols of the Cave; they arise from the peculiar nature either of mind or body of each individual, and from education and habit, and accidental circumstances which befall different persons. For that is a beautiful emblem of Plato's about the cave: for (to drop the fine-wrought subtlety of the allegory) if any one were to pass his life, from his early infancy until maturity, in a cave or dark and subterranean cavern, and would then suddenly come abroad and survey the magnificent structure of heaven and the world, there is no doubt but that several strange and absurd fancies would enter and strongly affect his mind. We indeed live in the view of heaven; yet, meanwhile, our minds are confined in the caverns of our bodies; so that it is unavoidable that they should imbibe endless images of errors and false impressions, if they come forth from their cave but rarely and for a short period, and do not dwell constantly in the contemplation of nature, and, as it were, under the open sky. And, indeed, with that allegory of Plato respecting the Cave, the similitude of Heraclitus well agrees, that men seek the sciences in their own lesser worlds and not in the world of nature.

But the most troublesome of all are the Idols of the Forum, which have insinuated themselves into the understanding from the tacit agreement amongst men respecting words and names. But words are usually imposed in accommodation to vulgar comprehensions, and distinguish things by the differences most obvious to common minds; but when a more acute understanding or a more accurate observation would draw a more philosophical distinction between things,

words offer obstructions. But the remedy proposed for this—namely, definitions—cannot, in most cases, meet the evil, inasmuch as definitions themselves are made up of words, and words beget words. But though we imagine that we control our words, and the expression is easily repeated, “let us speak with the vulgar and think with the wise;” though, moreover, technical terms (which are useful only to the scientific) may seem capable of remedying this defect; and though definitions (to which we have already alluded), prefixed to the several sciences (agreeably to the wisdom of the mathematicians), may be able to correct the erroneous acceptations of terms;—yet all this does not prevent the deceptions and incantations of words from seducing us in several ways, and doing a sort of violence to the understanding, and, like the Tartar’s bow, directing their attack backward on the intellect, whence they have had their origin. Wherefore this evil requires a new and deeper remedy. But we glance at these matters but cursorily at present, in the mean time declaring that there is a want of this doctrine, which we shall denominate the Grand Confutations, or those relating to the innate and adventitious Idols of the human mind. But we defer the systematical handling of them until we come to the Novum Organum.

There remains to be discussed what may be called an Appendix to the Art of Judgment, of great importance, which we also reckon a desideratum. Aristotle indeed has taken notice of the thing, but has nowhere traced out its method. It treats of the several sorts of demonstrations which should be applied to the several sorts of materials or subject-matters; so that this doctrine may contain, as it were, the judgments of judgments. For Aristotle has excellently remarked that we have no right to expect either demonstrations from orators, or persuasions from mathema-

ticians. So that, if there be an error in the nature of the proof, the judgment itself cannot be acquitted. But there being four sorts of proofs, either by immediate consent and common notions, or by Induction, or by Syllogism, or by that which Aristotle rightly calls Demonstration in Circle (that is to say, not from things more known, but from things, as it were, on the same level). These several modes of proof have their respective subjects, and materials of the sciences, wherein they may be employed; others from which they are excluded. For strictness and precision in requiring too exact proofs in some matters, and still more a readiness and carelessness in resting satisfied with proofs of a less rigorous kind in others, are to be reckoned among those things which have most injured and obstructed the progress of knowledge. And thus far on the Art of Judgment.

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## CHAPTER V.

DIVISION OF THE ART OF RETENTION INTO THE DOCTRINE RESPECTING THE HELPS OF MEMORY AND THE DOCTRINE CONCERNING MEMORY ITSELF. DIVISION OF THE DOCTRINE CONCERNING THE MEMORY ITSELF INTO PRENOTION AND EMBLEM.

THE Art of Retention or of Memory we shall divide into two doctrines; namely, the doctrine respecting the Helps of Memory and the doctrine concerning Memory itself. The Help of Memory is obviously Writing; and we must, by all means, give warning that the memory, without this aid, would be quite unequal to things of any length or requiring much accuracy; and that it should not be received at all unless it can appeal to written documents. And this holds especially in inductive philosophy and the interpretation of nature; for one might as well hope to make up the accounts of a journal by the bare memory, without

writing, as to be able for the interpretation of nature by the power of contemplation and the innate and unaided strength of memory, if the same memory were not furnished with assistance by tables properly arranged. But, not to mention the interpretation of nature, which is a novel doctrine, scarcely anything can be more useful, even to the old and popular sciences, than a substantial and proper help to the memory, that is, a good and learned digest of common-places. Nor am I ignorant, that the setting down in common-places of such things as we read or learn, is by some blamed as prejudicial to learning, as retarding the course of reading and alluring the memory to indolence. Yet, since it is a spurious thing in the sciences to be premature and quick, if you be not also substantially and variously furnished; we consider that industry and labour, in the collection of common-places, are of great and solid service in studies; as furnishing abundant materials to discovery and collecting to a point the keenness of the judgment. However, amongst all the methods and systems of common-places which I have ever chanced to see, I have discovered none of any value; for in their tables of contents they present the appearance more of the school than of the world, employing merely vulgar and pedantic divisions, and not such as can at all penetrate to the marrow and vitals of nature.

But the inquiry touching memory itself seems to have been made carelessly and superficially enough. There is certainly extant a sort of art concerning it; but it is manifest to us that not only may more scientific rules be obtained for the strengthening and enlargement of the memory than that art comprehends; but also that there can be planned a practice of the art superior to that commonly received. We doubt not, indeed (if any one would have a mind to misapply this art to ostentatious show), but that several strange

and extraordinary feats could be performed by it ; but the thing, in its present state, is barren, as it were, for the purposes of man. But meanwhile we do not ascribe to it the destruction and overloading of the natural memory (which is the common ground of objection) ; what we find fault with it for is, that it is not dexterously constructed to give aid to the memory in serious transactions and business. But we have a tendency (which may, perhaps, be accounted for by our political habits) to set little value on such matters as savour of art, and afford no real benefit. For to repeat in the same order promptly a great number of names or words rehearsed but once, or to compose several rhymes extempore on any subject, or to glance at anything that offers with a satirical comparison, or to turn serious matters into sport, or to elude everything by gain-saying or cavilling, and the like (of which there is a great store in the faculties of the mind, and which by talent and practice can be carried to wonderful lengths),—all these feats, and such as resemble them, we esteem not more highly than the nimble movements and tricks of rope-dancers and stage-players ; for the cases are almost the same, the one mis-applying the bodily, the other the mental strength, and may, perhaps, occasion some astonishment, but are of little real worth.

But the art of memory is founded on a twofold-appliance, namely, prenotion and emblem. We mean by prenotion a sort of cutting short of endless inquiry. For when one wishes to recall a thing to mind, if he has no prenotion or conception of the object of his search, he seeks indeed, and uses exertion, and casts about hither and thither, as if in an unlimited range. But if he has some definite prenotion, this endless pursuit is at once abridged, and the chase of memory takes place in a narrower compass, like the hunting of a deer in an enclosure. Accordingly, arrangement also evidently



aids the memory. For the prenotation presents itself that what we seek for ought to be of such a nature as to agree with the arrangement. In like manner verse is more easily learned than prose; for if we are at a loss for any word, the prenotation offers itself that it ought to be one which would harmonize with the verse. And this prenotation is the first part of artificial memory; for in artificial memory we have the heads previously arranged and prepared; we put together the ideas on the moment, as circumstances may require; but the prenotation occurs that the idea should be one that may in some degree suit the place,—a thing which awakens the memory, and in some degree guides it to the object we have in view. But the emblem brings down the intellectual to the sensible; and a sensible object always affects the memory more forcibly, and is impressed upon it more readily, than an intellectual. So that even the memory of brutes is roused by a sensible object, but not at all by an intellectual one. And so you may more easily retain the image of a hunter pursuing a hare, or of an apothecary arranging his boxes, or of a professor delivering a speech, or of a boy repeating verses by heart, or of an actor performing on the stage, than the notions themselves of invention, arrangement, elocution, memory, or acting. There are other matters also which are useful in aiding the memory (as we have already said), but the art, in its present state, consists of the two things already mentioned. But to trace the particular deficiencies in the arts would be a departure from our plan. Let these remarks, therefore, suffice on the art of memory or retention.

We now come, in due order, to the fourth department of logical science, which treats of communication or elocution.

THE SEVENTH BOOK  
OF  
THE ADVANCEMENT OF LEARNING.

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CHAPTER I.

DIVISION OF ETHICS INTO THE DOCTRINE CONCERNING THE EXEMPLAR AND THE GEORGICS OF THE MIND. DIVISION OF THE EXEMPLAR (THAT IS TO SAY, OF GOOD) INTO GOOD SIMPLE AND GOOD COMPARATIVE. DIVISION OF THE GOOD SIMPLE INTO PRIVATE GOOD AND GOOD OF COMMUNITY.

WE have arrived, excellent King, at Ethical Science, which regards and treats of the human will. Right reason directs the will, and apparent good leads it astray: the affections are the incentives of the will, its agents are the organs and voluntary motions. On this Solómon observes: "Keep thy heart, my son, with all diligence; for out of it are the issues of life." In the handling of this science, those who have written on it seem to me to have acted just as if one professing to communicate the art of writing would only exhibit fair copies of letters, single and combined, but would give no instructions as to the guidance of the pen, or the ways of forming the characters: so these writers have set before us handsome and elegant models, and accurate descriptions and representations of the Good, of virtue, duties, happiness, as the true objects and aims of man's will and desire; but how one can be most successful in hitting these

marks (which are excellent, indeed, and well set up by them),—in other words, by what systems and methods the human mind can be subdued and fashioned to the attainment of such objects,—they either give no directions at all, or such as are superficial and unprofitable. We may discuss, at what length we chuse, that the moral virtues exist in the human mind by habit, not from nature: we may make pompous distinctions between generous spirits and the ignoble crowd,—that the former are led by the influences of reason, the other by reward or punishment: we may acutely teach, that the human mind, in order to its correction, ought, like a staff, to be bent into the opposite of its natural tendency: and we may scatter here and there other observations of a similar kind: yet it is far from being true, that these discussions, and others of the same kind, excuse the absence of this part which we now require.

The cause of this omission I conceive to be no other than that hidden rock on which so many barks of science have struck and been shipwrecked; namely, that writers scorn to trouble themselves about ordinary and common matters, which are neither sufficiently subtile to afford materials for disputation, nor sufficiently dignified to admit of embellishment. Certainly no one can adequately express what mischief this fact which we mention has occasioned; namely, that men with innate pride and vain glory have selected such subjects for their dissertations, and such ways of discussing them, as may rather recommend their own talents than minister to the advantage of the readers. Seneca excellently observes: “Eloquence injures those whom it inspires with a desire to set off themselves and not their subject;” for writings ought to be of such a kind as would excite a love, not for the teachers, but for the doctrines taught. Those, therefore, pursue the right course, who can state of their counsels that which Demosthenes did, and conclude them

with the following sentence: "Which things if you will do, you shall not merely commend the orator for the moment, but yourselves too ere long, the state of your affairs being ameliorated." I, indeed, excellent King, that I may state the truth respecting myself, both in those works which I am at present putting forth, and in those which I contemplate hereafter, often knowingly and willingly relinquish the dignity of my talents and name (if any I possess), provided I may minister to the interests of mankind: and I, who, perhaps, am entitled to be an architect in philosophy and the sciences, descend to the rank of common labourer and porter, to the very humblest office, while undertaking and executing several tasks for which there is absolute necessity, but which others, from innate pride, shrink from. But (to return to our subject), as we commenced observing, philosophers have selected for themselves in Ethical Science, a resplendent and lustrous mass of matter, on which they might best exhibit either the acuteness of their understanding or the force of their eloquence; but have, in a great degree omitted those matters which are most serviceable to practice, because they could not be embellished with so much elegance.

Nor yet ought such eminent men to have despaired of success, like that which the poet Virgil both ventured to promise himself, and indeed attained, who acquired no less fame for his eloquence, genius, and erudition in unfolding agricultural observations, than for describing the heroic achievements of Æneas:

"Nor know I not how arduous to sustain  
The lowly theme, and grace with lofty strain."

Surely if men are seriously disposed not to write at leisure compositions to be read at leisure, but truly to minister to, and provide for, active life, these Georgics of the human

mind ought to be estimated among mankind of no less value than those heroic portraits of virtue, good, and happiness, on which such laborious pains have been bestowed.

Accordingly we shall divide Ethical Science into two main doctrines: the one treating of the Exemplar, or Image of Good; the other of the Government and Cultivation of the Mind, which department we have also been in the habit of calling the Georgics of the Mind: the former describes the nature of good, the latter gives rules for fashioning the mind thereto. The doctrine of the Exemplar (which regards and describes the nature of good) considers good either simple or comparative; that is to say, either the kinds of good, or its degrees. In the latter of these, those endless disputes and speculations respecting the supreme degree of good, which they used to call felicity, beatitude, and the chief good (which with the heathens were a sort of theology),—all those disputes, I say, the Christian religion has removed and discarded. For, as Aristotle observes, that “young men may be happy too, but not otherwise than by hope,” so we, instructed by the Christian faith, should regard ourselves as minors and youths, so as to contemplate no happiness but what lies in hope.

Being, then, fortunately delivered from this doctrine, as from the pagan heaven (in which department, doubtless, they have ascribed to human nature a higher elevation than it is capable of; for we see with what loftiness of style Seneca expresses himself, “It is true greatness to have at once the frailty of a man and the security of a god”), we may, with less sacrifice of truth or sobriety, in a great degree admit the other speculations transmitted from them with respect to the doctrine of the Exemplar. For with respect to the nature of positive and simple good, they have delineated it at least most beautifully and vividly, as if in exquisite paintings; most carefully representing to the eye the forms of the virtues

and duties, their situations, kinds, connexions, parts, subjects, provinces, actions, and administrations. Nor is this all; for they have recommended and instilled all of these into the human mind with great acuteness and liveliness of argument, and charms of persuasion: nay more (as far as words could accomplish it), they have most safely fortified the same against corrupt and popular errors and attacks. But as far as relates to comparative good, they have not failed in this department either in establishing those three orders of good: in their comparison of a contemplative with an active life; in their distinction between virtue accompanied with repugnance, and virtue which has already attained security and is confirmed; in the collision and strife between the right and the expedient; in their balancing the virtues one with another, and similar questions: so that I find this department respecting the Exemplar excellently cultivated, and that the ancients have displayed extraordinary abilities in it: yet after all, the philosophers were left far behind by the pious and active industry of the theologians, employed in weighing and determining moral duties and virtues, cases of conscience, and limitations of sins.

However (to return to the philosophers), if (before they turned to the popular and received notions of virtue, vice, pain, pleasure, and the rest) they had paused a little in their inquiry, and investigated the very roots of good and evil, and the fibres of those roots, they would have thrown great light, in my opinion, on all those matters which were afterwards to become subjects of investigation: above all, had they consulted the nature of things no less than moral axioms, they would have rendered their doctrines less prolix and more profound. And as this has been either altogether omitted, or very confusedly handled by them, we will briefly retouch it; and we will endeavour to open and cleanse the very fountains of moral matters, before

we arrive at the doctrine concerning the cultivation of the mind, which we class among the desiderata. For this (we conceive) will endow the doctrine concerning the Exemplar in some degree with new strength.

There is inherent in and impressed on every thing a desire for two kinds of good; the one, wherein a thing is considered as a whole within itself; the other, wherein it is a part of some greater whole. And this latter is more worthy and more powerful than the former, as tending to the preservation of a larger form. Let the first be denominated the good of the individual or self; the latter, the good of the community. Iron with particular sympathy tends to the loadstone; but, if it be a little more weighty, it loses such a tendency, and, like a good citizen and patriot, seeks the earth, that is to say, the quarter of things of a like nature with itself. Let us go on a little further: dense and heavy bodies tend to the earth, the great assemblage of dense bodies; however, rather than nature should suffer disunion, and a vacuum (as the phrase is) be occasioned, bodies of this kind will move upwards, and will neglect their duty towards the earth, that they may discharge it towards the world. Thus it universally prevails, that the preservation of a larger form renders subordinate to itself the lesser desires. But that superiority of the good of community is chiefly apparent in man, unless he be degenerate; according to that memorable saying of Pompey the Great, who being commissioner for the importation of grain, at a time when Rome was pressed with scarcity, and being most earnestly dissuaded by his friends from putting to sea when a violent tempest was threatening, merely gave this reply: "It is necessary for me to go, not to live:" so that the love of life (which is the strongest desire an individual has) did not outweigh his love and loyalty towards his country. But why waste time? In no age has there existed any philosophy, or sect, or religion, or

law, or system, which so much exalted the good of community and depressed that of the individual, as the holy Christian faith: the clear conclusion from which is, that it was one and the same God who gave to inanimate creation those laws of nature, and to men the law of Christ. Accordingly we read, that some of those elect and holy men wished themselves to be blotted from the book of life, rather than that salvation should not reach their brethren; influenced by a sort of ecstasy of charity, and irresistible longing for the good of community.

This, then, being fixed as an immovable and unshaken conclusion, puts an end to some of the most serious controversies in moral philosophy. For, in the first place, it decides the dispute with regard to the preference of contemplative to active life; and that too against the opinion of Aristotle. For all the arguments brought forward by him, in favour of the contemplative life, relate to private good, and the pleasure and dignity of the individual alone, in which respects the contemplative unquestionably has the pre-eminence. For the contemplative life is aptly illustrated by the comparison employed by Pythagoras to maintain the honour and glory of contemplation and philosophy: for on being asked by Hiero what he was, he replied: "That Hiero (if he chanced ever to be present at the Olympic games) must have observed, that it happened there that some came to try their fortune in the contests; others, as merchants, to make sale of their commodities; others to meet their friends flocking together from all quarters, and indulge in feasting and merriment; others, lastly, to look on at the rest: and that he was one of those who came to look on." But men should know that in this theatre of human life, it is the part of God only, and the angels, to be lookers-on. And, indeed, it never could have happened that a doubt should arise on such a



matter in the Church (though so many were fond of repeating the sentence: "Precious in the eyes of the Lord is the death of his saints;" from which passage they used to extol that civil death, and the institutions of the monastic and regular life), but with the understanding, that that monastic life is not barely contemplative, but occupied with ecclesiastical duties, such as constant supplication and offering up of prayer to God, also the composition of theological works, in their abundant leisure, for the purpose of propagating the doctrine of the Divine Law, as Moses also did, when he tarried so many days in the retirement of the mountain. Nay also, Enoch, the seventh from Adam, who seems to have been the originator of the contemplative life (for he is said to have walked with God), yet bequeathed to the Church a book of prophecy (which is quoted by Saint Jude). But, as to a life of bare contemplation and one confined within itself, without shedding any rays either of heat or light on human society, theology certainly disowns it.

It likewise decides the question debated with so much vehemence between the schools of Zeno and Socrates on one side, who placed happiness in virtue, either taken alone, or with adjuncts (whose chief exercise is always in the active duties of life), and several other sects and schools on the other side: for instance, the schools of the Cyrenaics and Epicureans, who made it to consist in pleasure, and made virtue (as in some comedies where the mistress and maid change dresses) only a servant without whose aid pleasure could not be suitably attended to; and also the second, and what might be called the reformed school of Epicurus, which held that happiness was nothing but the tranquillity and serenity of a mind disengaged and free from perturbations; as if they purposed to dethrone Jupiter, and reinstate Saturn, and the golden age, when there was neither summer nor winter, nor spring, nor

autumn, but one uniform season; lastly also, that exploded school of Pyrrho and Herillus, who thought happiness consisted in wholly banishing any doubts of mind, holding that the nature of good and evil was not fixed and immutable, but that actions were good or bad according as they proceeded from the mind with unmixed and unhesitating impulse, or on the other hand, with dislike and repugnance,—which opinion, however, was revived in the heresy of the Anabaptists, who measured all things by the motions and impulses of the spirit, and the strength or weakness of their faith. Now it is manifest that all those opinions which we have enumerated have regard to the private tranquillity and satisfaction of mind, and not at all to the good of society.

Furthermore, it confutes the philosophy of Epictetus, who goes upon this assumption, that happiness ought to consist in things that are in our power, that so we may not be exposed to the turns and chances of fortune: as if it were not much happier to fail and be disappointed in just and generous undertakings and purposes that regard the public good, than be constantly successful in all things which concern merely our own private fortune. As Gon-salvo, pointing out Naples to his soldiers, in generous language protested, that “he had much rather meet certain death by advancing a step, than by retreating a step prolong his life many years;” with which sentiment also agrees the saying of that heavenly chief and leader, who declares that “a good conscience is a continual feast,” by which words he plainly intimates, that a mind conscious of good intentions, however unsuccessful, affords a joy more genuine, more unmixed, and more agreeable to nature, than the entire of that provision wherewith a man can be furnished either for enjoyment or repose.

It likewise confutes that abuse of philosophy which began to grow general about the time of Epictetus, namely, the

conversion of it into a kind of profession and trade; as if, forsooth, the purpose of philosophy were not to resist and eradicate disorders, but to avoid and remove the causes and occasions of them; and that, therefore, some particular system of living should be adopted for the attainment of this object; introducing into the mind the same kind of health as was that of Herodicus in his body, of whom Aristotle mentions that he did nothing all his life but attend to his health, and, with this object, refrained from numberless things, in the meantime depriving himself of the use of his body. Whereas, if men's object be to discharge their duty to society, that kind of health is most desirable which can bear and overcome any changes and assaults. Just so, that mind is only to be considered truly and properly sound and healthy, which is able to overcome the most numerous and most trying temptations and disorders. So that Diogenes seems to have expressed himself excellently in commending such strength of mind "as furnished power, not for warily abstaining, but firmly sustaining," and which could check the impetuosity of the mind even on the greatest steps; and would enable it to stop and wheel round on the shortest notice (a quality much commended in well-trained horses).

Furthermore, it censures a kind of delicacy, and an unfitness for adapting themselves to circumstances, which may be observed in some of the most ancient and esteemed philosophers, who too readily withdrew from public life for the purpose of getting rid of indignities and annoyances, and that they might live, as they thought, less exposed to harm, and, as it were, inviolable: whereas it were fit that the resolution of a truly moral man were such as Gonsalvo (who was mentioned above) required in a military man, namely, that his honour should be spun as if of coarser stuff, and not of such fine material as that any thing at all could catch in and tear it.

## CHAPTER II.

THE DIVISION OF INDIVIDUAL OR PRIVATE GOOD INTO ACTIVE AND PASSIVE. DIVISION OF PASSIVE GOOD INTO CONSERVATIVE AND PERFECTIVE. DIVISION OF THE GOOD OF COMMUNITY INTO GENERAL DUTIES AND SPECIAL DUTIES.

LET us now resume and pursue the discussion of Individual and Private Good. We shall divide it into active good and passive good. For this distinction also of goods (which is well illustrated by the difference between those terms of frequent occurrence in the domestic economy of the Romans, namely, *promus* (dispenser), and *condus* (storer)), is found impressed on universal nature, and is most clearly seen in the two appetites of created things,—the one, to preserve and secure themselves, the other, to multiply and propagate themselves. And the latter, which is active, and, as it were, the *Promus*, seems the worthier and nobler of the two; but the former, which is passive, and, as it were, the *Condus*, should be regarded as inferior. For, in the natural universe, it is the celestial nature that is, for the most part, active; but the terrestrial nature passive. In the pleasures, too, of living creatures, that of generation is greater than that of food. In the divine oracles also it is declared “that it is more blessed to give than to receive.” Again, in common life, no one is found of such a weak and effeminate character as not to value more highly the accomplishment and the bringing to a happy issue of any object of his desire, than any sensual gratification or amusement. And this superiority of the active good is immensely enhanced by reflecting on the lot of man as being exposed to mortality and the strokes of fortune. For if in the pleasures of men perpetuity and certainty could be procured, their value would be largely increased on account of the security and permanency. But seeing, as we do, that the matter comes to this, that “we think

a late death a great gain;" and "boast not thyself of to-morrow, for thou knowest not what a day may bring forth;" it is not at all surprising if we use every exertion for the attainment of such objects as fear not the injuries of time. Now these can be none else than our works: as it is said, "their works do follow them." There is also a second and not inconsiderable superiority of the active good, occasioned and upheld by that affection which cleaves to human nature as an inseparable companion, that is to say, the love of novelty or variety. Now, in sensual pleasures (which are by far the greatest part of the passive good) this is much narrowed, and does not admit of any great latitude: "Consider how often you have repeated the same things; food, sleep, play,—in this circle do we run. A man may wish to die, not only from fortitude, or wretchedness, or prudence, but even from satiety." But in the actions of our life, and our designs and ambitious aims, there is remarkable variety; and this is felt with great pleasure, whilst we enter on, proceed, rest, retrograde that we may acquire strength, approach, lastly obtain, and the like: so that it was a true observation: "life without a fixed purpose is languid and unsteady." And this is applicable alike to the wise and to the most foolish, to use Solomon's words: "Through desire the passionate man seeketh and intermeddleth with all things." Nay, more, we see the most powerful monarchs, at whose nod everything calculated to gratify the senses could be procured, yet sometimes sought out, for themselves humble and frivolous objects of desire (as Nero practised harp-playing, Commodus the gladiator's art, Antoninus that of a charioteer, and so on), which pursuits, however, were preferred by them to all the abundance of sensual pleasures. So much greater pleasure results from action than from enjoyment.

Meanwhile we should carefully observe, that the active individual good is wholly different from the good of commu-

nity, though they may occasionally coincide. For though that active individual good may frequently bring forth and produce works of beneficence (which is one of the virtues of community), yet there is this distinction, that these works are done by most men, not with the view of aiding or benefiting others, but with merely private views, and for the sake of their own power and aggrandizement. A truth which is best perceived when the active good meets with anything opposed to the good of community. For that giant-like disposition of mind by which those mighty troublers of the world are hurried away (like Lucius Sylla, and several others of lesser degree), who seem to pant after this object, that all should be happy and miserable according as they are their friends or foes, and that the world should carry, as it were, their impress (which is truly warring against heaven); this disposition, I say, aspires to the active individual good, at least what appears to be so, though it be at the greatest possible distance from the good of community.

But we will divide the passive good into conservative good and perfective good. For there is inherent in everything a three-fold desire so far as relates to the good of self or the individual. First, of preserving itself; secondly, of perfecting itself; thirdly, of multiplying or extending itself. And this last desire relates to the active good, of which we have spoken above. The other two species of good, therefore, only remain, of which the perfective is the superior; for to preserve a thing in its existing condition is the less, to elevate it to a more dignified nature, the greater. For throughout the universe are found some nobler natures to whose dignity and excellence inferior natures aspire, as to their origin and source. Thus, well did the poet sing of man—

“His fiery spirit claims celestial birth;”

for the assumption of, or approach to the divine or angelic nature, is the perfection of man's nature; the perverted and absurd imitation of which perfective good is the very plague of human life, and, as it were, a rapid whirlwind which carries away and overthrows everything. That is to say, whilst men, instead of a real and essential advancement, fly with blind ambition to a merely local advancement. For as the sick, when unable to procure a remedy for their malady, toss and roll from place to place, as if they could by change of position depart from themselves, and escape the internal evil: just so it happens in ambition, that men, hurried away by some unreal imagination of elevating their nature, attain nothing else than a sort of eminence and height of position. But conservative good is nothing else than the acquirement and enjoyment of objects agreeable to our nature. But this good, though the most simple and natural, yet seems the feeblest and lowest of all. This good also admits a certain distinction; respecting which, partly man's judgment has wavered, and partly inquiry has been neglected. For the worth and excellence of the good of enjoyment, or, as it is commonly called, of pleasure, consists either in the unmixedness of fruition, or in the intensity of it; the one of which is occasioned by uniformity, the other by variety and vicissitude: the one has less mixture of evil, the other a stronger and more forcible impression of good. Now, which of these two is preferable, is a controverted question: but then it is not investigated whether human nature can retain both together.

And with respect to the controverted point there arose a discussion between Socrates and a Sophist. And Socrates, indeed, declared that happiness consisted in constant peace of mind and tranquillity; but the Sophist, in desiring much and enjoying much. And then they fell from argument into abuse: the Sophist saying that the happiness of Socrates

was that of a stock or a stone: and, on the other hand, Socrates declaring that the Sophist's happiness was that of one who had the itch, who was continually itching and scratching. And to neither of their opinions are supports wanting. For to Socrates agrees even the School of Epicurus, which does not deny that virtue is the chief source of happiness. And if this be so, it is most certain that virtue is more useful in calming perturbations than in compassing objects of desire. But the Sophist seems, in some degree, supported by that assertion lately made by us, namely, that perfective good is superior to conservative good; inasmuch as the attainment of objects of desire seems gradually to perfect our nature; which though, in fact, it does not, yet even circular motion bears some resemblance to progressive motion.

But the second question (namely, whether human nature cannot, at the same time, retain both tranquillity of mind and a high degree of enjoyment), being rightly determined, renders the former idle and superfluous. For do we not often observe the minds of some to be so made and constituted, that they feel the strongest sense of pleasures whilst they are present, and yet endure the loss of them with equanimity? So that that philosophical sequence,—“Not to use, that you may not desire; not to desire, that you may not fear;”—seems the sentiment of a weak and despondent mind. Indeed most of the doctrines of the philosophers seem somewhat too timid, and to be more wary for mankind than the nature of things requires. For instance, when they increase the fear of death by endeavouring to remedy it. For when they make the life of man scarcely any thing else than a sort of preparation and training for death, how is it possible that that enemy should not appear wonderfully formidable, against whom there can be no end of fortifying one's self? Better says the poet (though a heathen)—

“A soul that can securely death defy,  
And count it Nature's privilege to die.”



In like manner also, in all things, the philosophers have attempted to make the human mind too regular and uniform, by not habituating it to contrary and extreme motions. The cause of which, I think, was, that they devoted themselves to a private life, exempt from business, and the care of pleasing others. But men should rather imitate the wisdom of jewellers, who, if there should chance to be found in a precious stone a little cloud or speck, which may be extracted so as not to take too much off the stone, remove it, but otherwise leave it untouched: in like manner we should take such measures to procure tranquillity of mind, as not thereby to destroy magnanimity. And thus far have we treated of individual good.

After having concluded our discussion on the good of self (which we are also wont to call particular, or private, or individual good), let us return to the good of community, which regards society. It is generally known by the name of duty: for the term "duty" is with more propriety applied to a mind well regulated towards others, the term "virtue" to a mind well formed and constituted within itself. But, at first sight, this department seems to appertain to Political Science: yet on more attentive examination, it will be found to be otherwise, for it treats of the government and authority of each person over himself, and not at all over others. And as, in architecture, it is one thing to frame posts, beams, and other parts of a building, and prepare them for architectural purposes; and another thing to join them together and construct the building: again as, in mechanical matters, the making and completing of an instrument and machine is not the same as erecting, moving, and employing it when completed: so the doctrine about the actual union of men in society differs from that which renders them conformable and well-affected to the interests of a society of this nature.

That part respecting duties, is likewise subdivided into two parts: one of which treats of the general duties of man;

the other of his special and peculiar duties according to the profession, calling, position, character, and grade of each individual. The first of these I have already stated to be sufficiently cultivated and carefully explained by the ancients and others. The second part, also, I find treated of in detached portions, but not digested into a separate body of science. However, I do not find fault with the practice of treating it in detached parts. Nay rather, I think it far more advisable that this subject should be discussed in parts. For who is endowed with such penetration or boldness, as to have the power, or confidence, of skilfully and forcibly discussing and determining the particular and relative duties of the several orders and conditions of life? But treatises, which savour not of experience, but are merely taken from a general and scholastic knowledge of things, on matters of this nature, usually turn out idle and profitless. For though it may sometimes happen that a looker-on observes what escapes the notice of the player, and there is in use a certain proverb, more bold than sensible, as to the judgment of the populace on the actions of their rulers, that "one standing in the valley can best survey the mountain;" yet it were specially desirable that none but the most experienced and practised men should engage in arguments of this kind. For the lucubrations of speculative men in matters of business, seem to men actively employed no better than the dissertations of Phormio concerning war, which Hannibal looked upon as dreams and ravings. Only there is one fault which possesses those who write books on things connected with their own profession or art, and this is, that they know not how to keep within the proper bounds in honouring and extolling their favourite pursuits.

Whilst treating of books of this kind, it would be a criminal neglect not to notice (with all respect) that most excellent work, the result of your Majesty's labours, "On

the Kingly Office;" for this composition has accumulated and stored within itself treasures, both conspicuous and hidden, of Theology, Ethical and Political Science; and it is, in my judgment, of all the books it has been my lot to read, one of the soundest and most solid. In no passage is it fevered with the heat of invention, nor is it benumbed or stupid with the cold of carelessness; nor is it ever seized with a giddiness that might occasion a confusion in, or a departure from, its arrangement; nor is it rent asunder with digressions, so as to comprehend in its mazy wanderings matters irrelevant to the main question; nor is it adulterated with perfumes and paints, such as are used by those who minister rather to the delight of their readers than the nature of their argument: above all, that work is no less sound in spirit than in body, as perfectly harmonizing with truth, and being admirably adapted to the practice of life. Furthermore, it is wholly free from that fault which I mentioned above (a fault which, if tolerable in any one, is surely so in a king, and in a book written on regal majesty), namely, that it does not immoderately or invidiously elevate the dignity and eminence of kings; for your Majesty has described not a king of Assyria or Persia, shining and glittering with oriental splendour and magnificence, but, in truth, a Moses or a David, who were the shepherds of their people. Nor indeed shall a certain truly regal expression ever escape my memory, which your Majesty, agreeably to that sacred spirit with which you are endowed for the government of nations, uttered in deciding a most weighty cause of judicature, to the following purport: "That kings hold the helms of government according to the laws of their kingdoms, as God governs according to the laws of nature; and that they ought to employ that prerogative of their's, which is superior to the laws, as rarely as we observe God employing the power of working miracles." And yet from that

other book "Of Free Monarchies," the composition of your Majesty, it is sufficiently clear to all that the plenitude of regal authority, and the "ultimities" (to use the scholastic phrase) of royal rights, are no less thoroughly known and understood by your Majesty, than the limits and barriers of the regal office and function. I have not, therefore, hesitated to bring forward that book, the labour of your Majesty's pen, as an eminent and most striking instance of treatises on particular and special duties. On which book, the remarks I have just made would have been equally expressed if it had been written by any king a thousand years ago. Nor, indeed, am I influenced by that rule of politeness which is usually laid down, not to praise a person in his presence, provided always the praise given be not immoderate, or unseasonable, or undeserved. Cicero, certainly, in that most brilliant oration of his for M. Marcellus, does nothing else than exhibit a painting, as it were, of the praises of Cæsar, finished with exquisite skill, though the speech was delivered in his presence; and this also Pliny the younger did for Trajan. And now let us resume our subject.

Furthermore, to this department on the special duties of the several callings and professions, appertains another doctrine, correlative, as it were, to the former, and its opposite; namely, one treating of the frauds, stratagems, impostures, and vices of them; for corruptions and vices are opposed to duties and virtues. And this is not wholly unnoticed in several writings and treatises. But they often make, at least, a passing excursion for the purpose of referring to them. But in what way? In the way of satire, and cynically (like Lucian), rather than with seriousness and gravity. For more labour is expended for the purpose of maliciously railing at, and exposing to the derision of mankind, several things which are useful and sound in the arts, than for se-

paring what is corrupt and vicious in the same from what is wholesome and pure. But Solomon excellently observes: "A scorner seeketh wisdom, and findeth it not; but knowledge is easy unto him that understandeth." For whosoever proceeds to the acquisition of knowledge with the view of scoffing and despising, shall find, without doubt, many things about which to cavil, but very few to increase his knowledge. But a treatise on the subject of which we speak, composed with gravity and prudence, and with a combination of integrity and sincerity, seems worthy of being reckoned among the securest defences of virtue and probity. For as the fable tells of the basilisk, if it sees any one first, it straightway destroys him, but if any one sees it first, it perishes; in the same way, frauds, impostures, and deceitful arts, if any one first discover them, are deprived of the power of doing harm; but if they be before-hand, then, indeed, but not otherwise, they occasion danger. We have reason then for returning thanks to Machiavelli, and writers of that kind, who openly and without disguise state what men are wont, not what they ought, to do. For it is absolutely impossible to unite the wisdom of the serpent with the harmlessness of the dove, if one be not thoroughly acquainted with the nature of evil itself. For without this, virtue will be at a loss for its due protections and defences. Nay, a good and upright man cannot possibly reclaim and reform the wicked and dishonest without first exploring himself all the hiding-places and depths of villany. For those whose judgment is altogether corrupted and depraved are under the impression that integrity in mankind arises from a sort of ignorance and simplicity, and from the fact of credit being given to preachers and teachers, or books, moral precepts, and discourses, that are commonly delivered and repeated; so that, unless they clearly perceive that their erroneous opinions, and corrupt and perverted principles, are

no less thoroughly examined and known by the persons who give them admonition and advice, than by themselves, they will despise all integrity of morals and counsels, according to that admirable oracle of Solomon: "The unlearned receives not the words of knowledge unless you first speak of what is within his own heart." But this department on stratagems and special vices we count among the things wanting, and we shall give it the name of Serious Satire, or a treatise on the Internals of Things.

To the doctrine about special duties appertains the treatment of mutual duties, such as between husband and wife, parents and children, master and servant; as likewise of the laws of friendship and gratitude, and also the civil obligations of fraternities, corporate bodies, neighbourhood, and the like relations. But let it be always understood that these are here discussed, not as parts of civil society (for that belongs to Political Science), but in so far as the minds of individuals ought to be prepared and adapted to the maintenance of those bonds of society.

But the doctrine of the good of society (as also that concerning individual good) treats of good, not only in kind but in degree; to which belongs the weighing of duties between man and man, between case and case, between things private and things public, between the present time and the future; as we may observe in the case of that harsh and stern sentence of Lucius Brutus on his sons, how some extol the glory of it to heaven, but another thus expressed himself:

"Howe'er posterity may rate the deed,  
Unhappy he!"

We may observe the same in the account of that supper to which M. Brutus, C. Cassius, and others, were invited: for there, when, with a view to sound their inclinations on the

conspiracy formed against Cæsar's life, the question was artfully started, was it lawful to slay a tyrant?—the guests were divided in opinion; some asserting it was clearly lawful, because slavery was the worst of evils; others, on the contrary, declared that a tyrant was less destructive than a civil war; but a third class, as being of the Epicurean school, asserted it was unbecoming that wise men should risk themselves for fools. But there are many cases of comparative duties, among which this is of most frequent occurrence: whether we should deviate from justice for the welfare of our country, or some other extraordinary advantage in prospect? Respecting which, Jason, of Thessaly, was in the habit of saying, that “a few things must be done with injustice, in order that many things may be done with justice.” But there is a ready reply. You have an authority for present justice; you have no warrant of future. Let men follow what is good and just at the time, and leave the future to divine Providence. And thus far our observations on the Exemplar, or on good.

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### CHAPTER III.

DIVISION OF THE DOCTRINE CONCERNING THE CULTIVATION OF THE MIND, INTO THE DOCTRINE RESPECTING THE CHARACTERS OF THE MIND, ITS AILMENTS, AND ITS REMEDIES OR CURES. APPENDIX TO THE SAME DOCTRINE, CONCERNING THE ANALOGY BETWEEN THE GOOD OF THE MIND AND THE GOOD OF THE BODY.

Now, therefore, having concluded our discussion on the fruit of life (taking that phrase in the philosophical sense), it remains for us to speak of the cultivation of the mind required for it, without which the first part seems nothing else than a sort of image or statue, fair, indeed, to look

upon, but destitute of motion and life. To which opinion Aristotle himself, in express terms, subscribes: "It is necessary, therefore, to speak of virtue, both of its nature, and from what it arises. For it would be perfectly useless to be acquainted with the nature of virtue, and not to know the methods and ways of acquiring it. For our only inquiry about virtue ought not to be of what kind it is, but we should also examine how we may be enabled to possess ourselves of it; for we have both objects in view, to know virtue, and also to attain it. But this will not succeed as we desire unless we know both from what it is produced, and how." In such express, and even reiterated language does he inculcate this department, which, however, he himself does not fully discuss. This, likewise, is what Cicero ascribes to Cato the younger, as no vulgar praise, namely, that he had embraced philosophy, not with a view to controversy, as many do, but to conform his life to its precepts. But although, on account of the sloth of the times wherein we live, but few have any anxiety for the careful cultivation and regulation of their mind, and for directing their life by some fixed rule (which illustrates the remark of Seneca, "every one deliberates on the parts of life, no one on its whole," so that this department may be reckoned superfluous); yet this by no means induces us to leave it untouched, nay, we rather conclude with that aphorism of Hippocrates: "When persons labouring under a severe disorder have no sense of pain, their mind is diseased." Such persons have need of medicine, not merely for assuaging the disease, but also for awakening the sense. But if any one object that the cure of men's minds is the office of sacred theology, what he states is quite true; yet what hinders moral philosophy from being admitted into the household of theology, like a wise handmaid and faithful attendant, ready to wait upon all her wishes? For as we read in the



Psalm, that "the eyes of a maiden look constantly to the hands of her mistress," though there is no doubt that many things are left to the judgment and care of the servant; in the same way also Moral Science ought to be subservient to Theological, and obedient to its directions, yet so that it also can comprise, within its due limits, many sound and useful instructions.

This department, therefore (when I reflect on its excellence), I cannot but wonder at not seeing reduced into some system of doctrine, and, since I rank it among the desiderata, I shall give a slight sketch of it.

We must first of all, then, in this matter (as in every thing else which refers to practice) make up our accounts as to what is in our power, and what not. For, in the former, alteration is allowed, but in the latter, application merely. The husbandman has no power over either the nature of the soil or the weather; nor the physician over the natural frame and constitution of the patient, or the variety of accidents. But in the cultivation of the mind, and the healing of its disorders, three things come under consideration; the different characters of dispositions, the ailments, and remedies: as also in the treatment of bodily diseases, these three things are brought under our notice; the habit or constitution of the patient, the disease, and the cure. But of those three, the last only is in our power; not so the two first. But we must make no less careful inquiry into those matters which are beyond our power, than into those which are within it. For a distinct and accurate knowledge of them must form the basis of a doctrine respecting the remedies, in order that these may be applied more skilfully and successfully. For the dress cannot be fitted to the body, unless the measure of the body be first taken.

The first department, therefore, of the doctrine on the cultivation of the mind will be occupied with the various

characters of minds or dispositions. And we do not speak merely of the commonly treated tendencies to virtues and vices, or even to passions and affections, but of those which are more internal and radical. Certainly, the mind must be sometimes struck with wonder in this department also, to see it, for the most part, neglected or overlooked by writers both on Moral and Political Science, though it could throw the clearest light on both sciences. In astrological traditions the tempers and dispositions of men are distinguished, not without ability, according to the predominance of particular planets; that some are naturally adapted for a contemplative life, others for civil pursuits, others for war, others for intrigue, others for love, and so forth. Likewise, among the poets (the heroic, satirical, tragic, and comic), are everywhere scattered sketches of the various dispositions, though usually too highly coloured and to a degree exceeding truth. Nay, also, this very discussion on the various traits of tempers is one of those things wherein the common language of mankind is wiser than books (a thing rarely, yet sometimes, occurring). But by far the best materials for such a treatise may be derived from the wiser sort of historians; and that not from the panegyrics merely, which they are in the habit of introducing upon the death of some illustrious character, but much rather from the entire body of the history, as often as a person of this kind comes, as it were, upon the stage. For that image, so interwoven, seems a better description than any panegyric estimate could be; as we find in Livy, that of Africanus and Cato the elder; in Tacitus, that of Tiberius, Claudius, and Nero; in Herodian, that of Septimius Severus; in Philip de Comines, that of Louis the XI., King of France; in Francis Guicciardini, that of Ferdinand of Spain, Maximilian the Emperor, and Popes Leo and Clement. For these writers having constantly in view the models, as it

were, of those characters whom they have chosen for the purpose of portraying, hardly ever make mention of any of their actions without adding something on the characters of the agents. Some of the narratives, also, which we have met with, on the conclaves of the Popes, have exhibited able representations of the manners of the cardinals, as also the letters of ambassadors on the councillors of kings. Accordingly, of these materials of which we have spoken (and which are abundant and copious) there ought to be made a careful and complete treatise. We do not mean that in ethics (as is the case in history, poetry, and common conversation) those characters should be received as complete civil portraits, but rather as the simpler lines and traits of such portraits, which, by combinations and intermixtures, will produce any required likeness; and accounts should be given of their number and kind, and the way in which they are mutually connected and subordinated; so that there may be made a scientific and accurate dissection of tempers and minds, and that the secrets of individual character may be disclosed, and from knowledge of them rules for the cure of the mind may be more properly laid down.

Nor ought those traits of temper only, which are engraven by nature, be admitted into this treatise; but those also which in other ways are introduced into the mind, arising from sex, age, country, health, frame of body, and the like; and, moreover, those arising from difference of station, as of kings, nobles, the mean, the rich, the poor, magistrates and private persons, the prosperous, the unfortunate, and the like. For we see that Plautus considers it a species of miracle, that an old man should be generous: "the generosity of this man," he says, "resembles that of a youth." Saint Paul, also, when advising strictness of discipline to be exercised towards the Cretans ("rebuke them sharply"), arraigns the character of the nation in the

words of the poet: "The Cretans are always liars, evil beasts, slow bellies." Sallust remarks it as a trait in the tempers of kings, that it is usual with them to desire opposites: "The inclinations of kings are frequently as fickle as they are violent, and often self-contradictory." Tacitus observes, that honours and dignities more frequently deteriorate than improve men's dispositions: "Vespasian alone was changed for the better." Pindar makes the observation, that a sudden influx of good fortune frequently enervates and enfeebles the mind: "There are some who cannot digest great success." The Psalms intimate that it is more easy to observe moderation and calmness in stationary than in increasing fortune: "If riches increase, set not your heart upon them." I do not deny that Aristotle, in his Rhetoric, takes passing notice of some such topics, and that the same may be found here and there in the writings of some others: but they have never yet been incorporated into Moral Philosophy, to which they chiefly belong, just as treatises on the diversity of soils belong to the science of agriculture; or treatises on the different constitutions and habits of body to medical science. But now, at all events, this must be done, if we would not imitate the rashness of quacks, who employ the same medicines for all the sick, no matter what constitution they be of.

After the doctrine on the traits of temper comes that on the affections and perturbations, which are considered as the diseases of the mind, as has been already remarked. For, as the ancient politicians were in the habit of saying, respecting free governments, that the people were like the sea, and orators like the winds; because as the sea, of its own nature, would be calm and tranquil, were it not agitated and disturbed by the winds, so also the people, if left to themselves, would be peaceable and manageable, if they were not excited and stimulated by seditious orators: in

the same way it may be truly affirmed that the nature of the human mind would be calm and even, if the affections did not, like the winds, disturb and confound everything. And here again a new cause of wonder arises, that Aristotle, who wrote so many books on Moral Science, did not in them discuss the affections, which are a principal branch of that science; but in his Rhetoric, where they could only be discussed collaterally (namely, so far as they can be excited or influenced by language), found a place for them (in which passage, however, he discussed them with as much acuteness and success as his brevity would allow), for his dissertations on pleasure and pain are by no means sufficient for such a treatise as this, any more than one writing merely on light could be said to have written on the nature of the several colours, for pleasure and pain stand in the same relation to the particular affections as light to colours. The Stoics have given more attention to this subject (so far as we can conjecture from the materials we possess), bestowing it, however, rather on subtilty of definitions than on any full and copious discussion. I find, indeed, some little treatises elegantly written on certain of the affections, as on anger, false shame, and a few others. But, if the truth must be freely told, the principal teachers we possess in this science are the poets and historians, in whose works we may find vividly depicted and laid open the ways in which the affections are to be stimulated and enflamed; how they are to be soothed and calmed; how, again, to be restrained and bridled, to prevent them breaking out into action; how likewise they may manifest themselves, though suppressed and disguised; how they work; what changes they undergo; how they are involved in each other; how they conflict, and are opposed to each other; and innumerable things of this kind. Among which this last is of special service in moral and civil matters; that is

to say, how one affection may reduce another affection to order, and how we may employ the aid of one for the subjugation of the other, in imitation of hunters and bird-catchers, who use the assistance of beasts for snaring beasts, and of birds for snaring birds, which perhaps man, by his own power and unaided by brutes, could not so easily accomplish. Nay, also, on this foundation rests that excellent and universal employment in civil affairs, of reward and punishment, which are the supports of governments; for the predominant affections of fear and hope are used for the restraint and suppression of all mischievous affections. Just as in the government of a state it often occurs that one faction is kept to its duties by another; so it also happens in the internal government of the mind.

We now come to those things which are in our power, and which operate on the mind and affect and alter the will and appetite; and, therefore, possess most influence in producing a change of manners. In which department philosophers ought to have laboriously and industriously made inquiries on the power and efficacy of custom, practice, habit, education, example, emulation, company, friendship, praise, reproof, exhortation, fame, laws, books, studies, and other things of the same sort. For these are the influences which predominate in morals; by the agency of these the mind is affected and disposed; of these, as ingredients, medicines are compounded, which may be useful in preserving and recovering soundness of mind as far as that can be effected by human remedies. And from their number we shall select one or two, to dwell on for a short time, that they may serve as an example for the rest. We shall, therefore, slightly touch on custom and habit.

That opinion of Aristotle seems to me to savour of narrowness and carelessness of view; when he asserts that habit has no power over such actions as are natural; taking

as an illustration that, if a stone be thrown a thousand times into the air, it acquires not the slightest tendency to ascend of its own accord; moreover, that we see and hear no better by often seeing or hearing. For, though this may hold in some cases, where nature is absolute (the reasons for which I have not time to state at present), yet it is far otherwise in those cases where nature, with a certain degree of latitude, admits of intension and remission. He might, surely, have observed that a glove a little too tight is rendered looser by often putting it on the hand; that a staff, by use and time, is bent quite in the opposite of its natural shape, and continues for a while in that state; that the voice by exercise is rendered stronger and more distinct; that custom enables us to endure cold and heat; and several other things of the same kind. And these two latter instances are more analogous to the subject than those adduced by him. Nevertheless the more truth there is in the remark that virtues and vices consist in habit, the more he should have endeavoured to lay down some rules whereby habits of this kind might be acquired or got rid of; for several precepts can be given for the wise regulation of the exercises of the mind as well as of the body. We shall enumerate a few of them.

The first is, that we should, from the very commencement, be on our guard against tasks of too difficult or too easy a nature; for, if too great a burden be imposed, in the diffident temper you will check the buoyancy of hope, in the self-confident temper you will excite an opinion whereby it will promise itself more than it can accomplish, the consequence of which will be sloth. But in both dispositions it will happen that the trial will not answer the expectation, a circumstance which always depresses and confounds the mind. But if the tasks be of too trivial a kind there will be a serious loss on the total progress.

The second is, that in order to the exercise of any faculty for the acquirement of habit, two particular times should be carefully observed: the one when the mind is best disposed, the other when worst disposed to the matter. So that by the former we may make most progress on our way; by the latter we may, by laborious effort, wear out the knots and obstructions of the mind, by which means the intermediate times shall pass on easily and smoothly.

The third precept is that of which Aristotle makes incidental mention: "That we should, with all our strength (yet not running into a faulty excess), struggle to the opposite of that to which we are by nature most inclined," as when we row against the current, or bend into an opposite direction a crooked staff in order to straighten it.

The fourth precept depends on a general law, of undoubted truth, namely, that the mind is led on to anything more successfully and agreeably, if that at which we aim be not the chief object in the agent's design, but is accomplished, as it were, by doing something else: since the bias of our nature is such, that it usually dislikes constraint and rigorous authority. There are several other rules which may be given with advantage on the government of habit; for habit, if wisely and skilfully formed, becomes truly a second nature (as the common saying is); but, unskilfully and unmethodically directed, it will be, as it were, the ape of nature, which imitates nothing to the life, but only clumsily and awkwardly.

In like manner, if we had a mind to discuss books and studies, and their efficacy and influence upon the habits, might not several profitable rules be given relating thereto? Did not one of the Fathers, with great indignation, call poetry "the wine of devils;" because it does, in truth, produce several temptations, desires, and unfounded opinions? Is not the opinion of Aristotle very wise, and worthy of ma-



ture consideration, that "young men are not fit hearers of Moral Philosophy," because the heat of their passions is not yet calmed and quieted by time and experience of life? And, to tell the truth, whence arises it that the excellent books and discourses of ancient writers (wherein men have been most effectually invited to the pursuit of virtue, both by presenting to the view its august dignity, and also by exposing to scorn, arrayed, as it were, in parasites' coats, such vulgar opinions as tend to dishonour virtue), are of such little value in promoting honesty of life, and reforming vicious morals, but from this cause, that they are not usually read and thoroughly studied by men of mature years and judgment, but are left to boys and beginners only? Is not this also true, that young men are much less fit hearers of Political than of Moral Science, before they are thoroughly imbued with religious and moral knowledge, lest haply, from a perversion and corruption of judgment, they may fall into the opinion that there are no real and solid moral distinctions between things, but that every thing is to be measured by its usefulness or success; as in the poet's verse:

"Successful vice usurps the name of virtue."

And again:

"Sins alike unlike rewards have found,  
And whilst this villain's crucified, the other's crowned."

And in these words the poets seem to express themselves in the ironical language of indignant satire; but some political treatises seriously and positively take this for granted. For it pleases Machiavelli to speak thus: "If it had been Cæsar's lot to have been vanquished in war, he would have been more detestable than Catiline himself;" as if there were no difference but success alone between a very fury, a compound of lust and blood-thirstiness, and a lofty spirit, of all men (were it not for his ambition) the most to be admired. We see also

by this very case, how necessary it is for men to drink deeply of the doctrines of religion and morality before they taste of Political Science: it being a fact, that those who have been brought up in the courts of princes and in political affairs from their earliest years, hardly ever attain a genuine and deep-rooted integrity of principle: how much less will this be so if the teaching of books likewise lends its aid. Furthermore, even in moral lessons themselves, or, at all events, some of them, should not caution be equally taken lest men should be made by them obstinate, arrogant, and unsocial? According to the observation of Cicero on M. Cato: "Know that those godlike and noble qualities which we see in him are his own; those qualities which we sometimes find fault with are the result not of his nature but of his education." There are several other general rules concerning those things which are implanted in the minds of men by studies and books; for there is truth in the observation, that "studies become habits," which may be equally affirmed of those other matters—company, fame, national laws, and the rest which we have enumerated above.

But there is a kind of cultivation of the mind which seems still more exact and complete than any of the other. And it rests on this principle, that the minds of all men are found at certain periods in a more perfect condition, at other times in a state more depraved. And the purpose and design of this cultivation would be, that those good times should be cherished, and the evil blotted out, as it were, and erased from the calendar. The perpetuation of the good times is effected in two ways: by vows, or, at least, by most determined resolutions of mind, and by observances and exercises; which do not possess so much efficacy in themselves, as in this, that they keep the mind in the constant practice of duty and obedience. The cancelling of the evil times also can be accomplished in two ways: by a kind of

atonement or expiation for what is past, and a resolution to lead, as it were, a new life for the future. But this department seems obviously to appertain to religion; and no wonder that it should, since the true and genuine Moral Philosophy (as was before observed) only fills the office of a handmaid towards Theology.

Wherefore we shall conclude this department on the cultivation of the mind, with that remedy which is the most compendious and summary, and, at the same time, the most noble and effectual of all, whereby the human mind may be moulded to virtue, and put in a position the nearest approaching perfection. And that is, that we set before us such ends of life and of action as are honourable and virtuous, and moreover of such a nature as that we may have reasonable hopes of being able to attain them. For if these two things be supposed, namely, that both the ends of our actions are honourable and virtuous, and the resolution of the mind for the attainment and achievement of them determined and steady, it will follow that the mind will at once turn and mould itself, by the one course of conduct, into all the virtues. And this, unquestionably, is the operation which resembles the work of nature itself; whilst the others, of which we have spoken, seem only like the handiwork of art. For as a sculptor, when fashioning or carving a statue, shapes the figure of that part alone on which his hand is employed, and not the others (for instance, if he be employed on the face, the rest of the body remains an unwrought and shapeless block until he comes to it); but, on the other hand, nature, when forming a flower or an animal, at the same moment brings forth and produces the rudiments of all the parts: in the same way, when virtues are acquired by habit, whilst we are paying attention to temperance, we make little progress in fortitude or the other virtues; but when we have dedicated and devoted ourselves

completely to honourable and virtuous ends, whatever the virtue may be which those ends have recommended and prescribed to our mind, we shall find that we are already imbued and furnished beforehand with the requisite ability and a sort of predisposition towards the attainment and exhibition of it. And this may be the state of mind so admirably described by Aristotle, and which is honoured by him with the denomination not of virtue, but of a sort of divinity. His own words are: "But it is reasonable to oppose to ferocity that heroic or divine virtue which transcends humanity." And shortly after: "As beasts cannot be said to have vice or virtue, so neither can the gods: for as the condition of the latter is something more elevated than virtue, so that of the former is something different from vice." Pliny the younger, too, with the boldness of heathen exaggeration, sets up the virtue of Trajan not as an imitation, but as a model of divine virtue, in these words: "That men had no need to offer any other prayers to the gods than that they would prove as benignant and propitious governors to mankind as Trajan had proved." But such remarks savour of the profane vaunting of the heathen, who grasped at shadows larger than the substance. But true religion and the holy Christian faith aims at the reality itself: by impressing on the minds of men Charity, which is most fitly styled "the bond of perfectness," because it binds together and comprehends all the virtues. There is a most elegant saying of Menander's on sensual love, which is a sorry imitation of the divine: "Love is better than a left-handed sophist for human life." In which words he intimates that grace of manners is more successfully produced by love than by a silly sophist or preceptor, whom he styles left-handed. For he cannot, with his whole system of laborious rules and instructions, mould a man so that he may set a due value on himself, and conduct himself

handsomely in all things, with so much dexterity and readiness as love can. So, unquestionably, if any one's mind is kindled with the heat of true charity, he will rise to a greater height of perfection than by the whole system of moral doctrine, which, compared with the other, is like a sophist. Moreover, as Xenophon has well observed, "the other affections, though they elevate the mind, yet distort and derange it by their extravagancies and excesses; but love alone, at the same time, enlarges and composes it." So all the other human endowments which we admire, whilst they elevate nature, are occasionally liable to excess; but charity alone admits not of excess. The angels, in aspiring to power equal to that of God, transgressed and fell: "I will ascend, I will be like the Most High." Man, in aspiring to knowledge equal to the divine, transgressed and fell: "Ye shall be as gods, knowing good and evil." But neither angel nor man ever has been, or shall be, endangered by aspiring to a resemblance of the divine goodness or charity. Nay, we are even invited to such imitation: "Love your enemies, do good to them that hate you, and pray for them which despitefully use you and persecute you, that ye may be the children of your Father which is in heaven; for he maketh his sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust." Furthermore, in the original model of the divine nature, the heathen religion places the words in this order, "Optimus, Maximus" ("Best, Greatest"), and Holy Scripture declares, "His mercy is over all his works."

We have now, therefore, concluded this department of moral doctrine, which relates to the cultivation of the mind. Wherein, if any one should think, from a glance at the parts we have touched upon, that our labour consisted merely in reducing into an art or science whatever was omitted by other writers as trite and obvious, and of itself sufficiently

clear and plain, he may freely entertain his opinion. In the mean time let him remember the warning we gave from the very beginning, that our purpose was not to aim at beauty, but at practical use and truth. Let him also remember, for a moment, that fiction of the old parable about the two gates of Sleep :

“ Two gates the silent house of sleep adorn ;  
 Of polished ivory this, that of transparent horn ;  
 True visions through transparent horn arise,  
 Through polished ivory pass deluding lies.”

The magnificence of the ivory gate was striking indeed ; yet it was through the gate of horn that true visions passed.

By way of supplement there may be added the following observation on Moral Science, namely, that there is found a sort of relation and correspondency between the good of the mind and the good of the body. For, as we said that the good of the body consists of health, beauty, strength, and pleasure, so we shall find that the good of the mind, if we view it according to the doctrines of moral science, has this object in view, to render the mind sound and free from perturbations, beautiful and decked with the embellishments of true grace, vigorous and active in discharging all the duties of life,—lastly, not dull, but retaining a strong feeling of pleasure and of virtuous enjoyment. But all these qualities are as seldom found conjoined in the mind as in the body: for we may observe many who are eminent for strength of genius and courage of mind, whose manners exhibit scarcely any elegance or grace; or who possess abundance of elegance and grace of manner, but have not either integrity of mind to give the will, or vigour to give the power, of acting well; others endowed with minds virtuous and free from the stain of vice, who yet neither do honour to themselves nor service to their country; others,

who perhaps possess the first three qualities, yet, under the influence of a sort of stoical moroseness and dulness, perform the actions of virtue, but enjoy not its pleasures. But though two or three of those four qualities are sometimes found combined, yet it is of very unfrequent occurrence that they all are. We have now discussed that principal branch of Human Philosophy which views man so far as he consists of soul and body, but yet in his individual capacity, and without the social state.

## P R E F A C E

### TO THE NOVUM ORGANUM.

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THOSE who have presumed to dogmatise on nature as on a fully examined subject, whether induced to do so from self-conceit, or arrogance, or the professorial style, have done the greatest mischief to philosophy and the sciences. For they have been successful in suppressing and interrupting inquiry, just in proportion as they have been able to establish their own credit; nor have the advantages arising from their activity been equal to the injury they have occasioned by their misleading and destroying the activity of others. Whilst those who have entered on a course the opposite of this, and asserted that nothing whatever can be known, whether they have fallen into this opinion from an aversion to the old sophists, or from instability of mind, or even from an exuberance of learning, have certainly adduced no despicable reasons in support of their view; nevertheless, they have not derived their opinion from true sources, and, carried forward by a sort of zeal and affectation, have quite exceeded moderation. But the more ancient of the Greeks (whose writings have been lost) more wisely held the middle course between the arrogance of dogmatism and the despondency of scepticism; and though rather frequently intermingling complaints and expressions of indignation at the difficulty of investigation and the obscurity of things, and, as it were,



champing the bit, yet have not ceased to follow up their object, and continue their communication with nature, thinking (it would appear) that the rational course was, not to dispute about the possibility of any thing being known, but to test it by experiment: yet even they, exerting the unassisted force of the understanding, employed no rule, but placed all their dependence upon intense meditation and continual exercise and agitation of the mind.

Now our method, though difficult in operation, is easily described. It consists in determining gradations of certainty; in guarding the senses by what may be called a sort of reduction, but generally rejecting that operation of the mind which follows immediately after sense; and in opening and fortifying for the mind a new and certain way from the first perceptions of the senses. And the necessity of this was, without doubt, perceived by those who have so highly magnified the art of Logic. From which it is obvious that they sought supports for the understanding, and that they regarded with suspicion the natural and spontaneous process of the mind. But this remedy is applied too late when the case has already become clearly desperate,—when the mind has been prejudiced by the daily habits of life, and by corrupted doctrines and systems, and beset with the vainest idols; the art of logic, therefore, being a late preservative (as we have remarked), and in no respect remedying the case, has tended more to the establishment of errors than to the revelation of truth. Our only remaining hope and safety lies in this, that the whole operation of the mind be begun afresh, and that the understanding from the very commencement should be in no wise left to its own control, but always forced to proceed according to rule; and that the thing be done as if by machinery. Had men attempted mechanical labours with their unaided hands, without the power and assistance of instru-

ments, as they have without hesitation undertaken intellectual labours with the powers of the mind almost unassisted, there would be very few things which they could have moved and overcome, though employing the most strenuous and united efforts. And, just to pause awhile and look upon this comparison as in a mirror, let us ask, if any obelisk of unusual magnitude had to be removed to grace a triumph or any such pageant, and if men set about it with unaided hands, would not any sober spectator declare it to be an act of extraordinary madness? If they were to increase the number of workmen, and imagine they would be successful in this way, would he not be confirmed in his opinion? If they desired to make a choice, and get rid of the weaker, and only employ the robust and strong, and hoped that by this means, at all events, they would be successful in their object, would he not declare that they were still more extravagantly demented? Nay, further, if not satisfied even with this, they at length determined on having recourse to the athletic art, and directed all to attend with arms and nerves well and scientifically oiled and prepared, would he not exclaim that they were doing all in their power to be mad by rule and method? And yet men are hurried on with a like insane energy and unavailing combination in intellectual matters, whilst they anticipate great results from either the multitude and agreement, or superiority and subtlety of genius, or even strengthen the sinews of the mind by Logic (which may be reckoned a sort of athletic training); but, meanwhile, notwithstanding such zeal and effort, cease not (if one would judge rightly) to apply their unaided intellect. Though it is most evident, that in every great work which man's hand accomplishes, neither the strength of individuals can be increased, nor that of numbers be combined, without the use of instruments and machines.

After making these preliminary remarks, then, we ob-

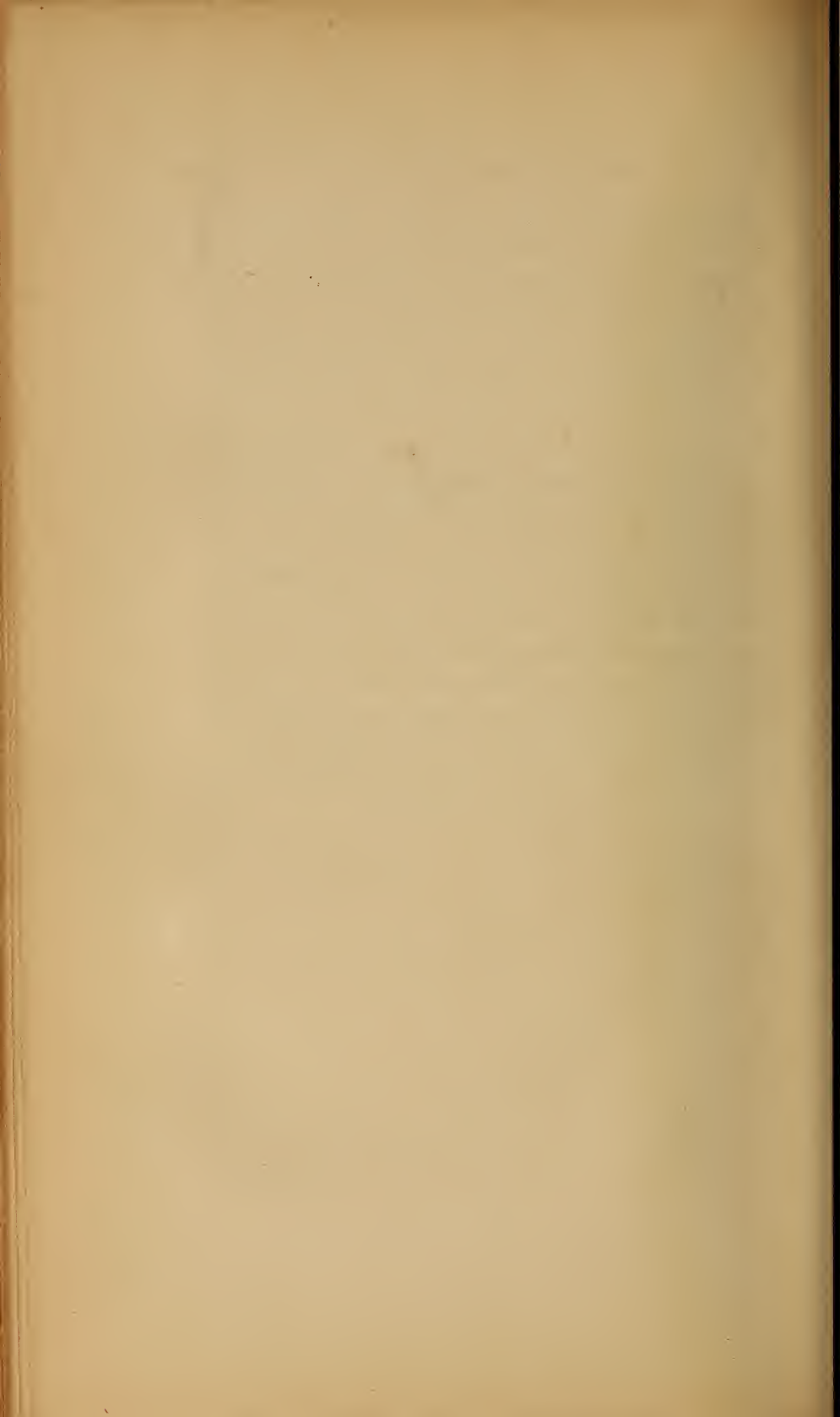
serve that there are two points on which we would have men plainly admonished, lest by any chance they may elude or escape them. The first of which is: that it happens by some good fortune (as we believe) for suppressing and removing all contradictory and angry feelings, that the honour and respect due to the ancients may remain untouched and undiminished, whilst at the same time we can accomplish our projected task, and yet reap the fruits of our moderation. For if we professed to bring forward anything better than the ancients, having entered upon the same course with them, we could not, by any ingenuity of expression, avoid the charge of engaging in a rivalry of genius, or excellence, or talent; and, though this would not be inadmissible or unprecedented (for why should not we, by our own right,—a right possessed by all the world,—censure and brand anything wrongly discovered or laid down by them?) yet, however fair and allowable, the contest still would be hardly equal on account of our disproportionate strength. But when the object aimed at by us is that an entirely new course, untried and unknown to them, should be opened for the understanding, the case is wholly altered; zeal and party feeling are at an end, and we only sustain the character of a guide,—thus claiming but a moderate share of authority, and avowing ourselves more indebted to good fortune than to talents and excellence. And this branch of my admonition relates to persons, the other to things.

We make no attempt whatever to disturb the system of philosophy which is now in fashion, or any other that exists, or may exist, more correct and comprehensive than it. For we question not that the received philosophy, and others of a like kind, may promote discussion, embellish oratory, and be serviceably applied to the duties of a professor and the business of civil life. Nay more, we give people clearly to understand that the system of philosophy which

we bring forward will not be very useful for such matters. It is not obvious, nor is it grasped in a hasty view, nor does it flatter the understanding in its preconceived notions, nor will it come down to the vulgar apprehension, unless by its advantages and effects.

Let there exist then (and may it be auspicious and happy for both!) two emanations and two departments of learning; two tribes, and, as it were, kindreds of observers or philosophers; and these not at all hostile or estranged from one another, but confederated and united, by assistance mutually rendered; in a word, let there be one method for cultivating the sciences, and another for discovering them. And as to those who prefer and adopt the former, whether from haste, or from motives of ordinary life, or because, from want of mental power, they are unable to grasp and comprehend the other (which must, of necessity, be the case with the great bulk of mankind), our desire for them is that they may be successful in the object which they have in view, and may attain that which they are in pursuit of. But if any individual should be desirous and anxious not merely to rest in present discoveries, and make use of them, but to penetrate still further, and not to overcome an antagonist by disputation, but nature by labour; in a word, not to conjecture with elegance and probability, but to know with certainty and demonstration: let such, as true sons of learning, join with us, if it shall seem good to them; in order that, having abandoned the ante-chambers of nature, trodden by the countless throng, passage may be at length afforded to her inner apartments. And that we may be the better understood, and that what we aim at may be the more familiar by the application of names; the one method or course is wont to be denominated by us, "The Anticipation of the Mind;" the other, "The Interpretation of Nature."

It remains for us to make one request. We indeed have employed anxious thought and attention, that the things which we shall set forth should be not only true, but should also make an agreeable and gentle approach to the understandings of men (though wonderfully prejudiced and limited). Yet it is but fair that we obtain of men (particularly when we are making so great a restoration of learning and the sciences) that whosoever may wish to form any judgment or opinion concerning this work of our's, whether from his own perceptions, or from the crowd of authorities, or the forms of demonstration (which have now obtained the force, as it were, of judicial laws), must not hope to succeed in this by a cursory or inattentive review; but should make himself thoroughly acquainted with the subject; should himself, by degrees, try the method which we describe and secure; should accustom himself to the subtilty of nature, which is disclosed by experience; should correct the vicious and deeply-rooted habits of his mind by a seasonable, and, as it were, legitimate hesitation; and then (if it shall so please him), and not till then, when he has begun to be his own master, should exercise his judgment.



## NOTES.

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### NOTES ON THE PREFACE TO THE INSTAURATIO MAGNA.

#### NOTE 1.

LOCKE remarks (in his Introduction): "I thought that the first step towards satisfying several inquiries the mind of man was very apt to run into, was to take a survey of our own understanding, examine our own *powers*, and see to what things they were adapted." A knowledge of our mental powers will, he thinks, be a useful security against Dogmatism, Scepticism, and *Idleness*.

With respect to this particular error of depreciating our powers, Brown gives a salutary caution: "We must beware that we do not measure the incapacity of the whole race of mankind by our own individual inability, or, which is far from improbable, that we do not mistake for inability, even in ourselves, what is only the irksomeness of long-continued exertion. Our power is often much greater than we are willing to believe, and in many cases, as La Rochefoucault very justly says, it is only to excuse to ourselves our own indolence that we talk of things as impossible. 'Non putant fieri,' says Seneca, speaking of persons of this character, 'quicquid facere non possunt. Ex infirmitate suâ ferunt sententiam'.—'Scis quare non possumus ista? Quia nos posse non credimus.'"—*Brown*, Lecture xiii.

## NOTE 2.

This expression alludes to the Frontispiece of the original edition of the *Instauratio Magna*, which represents a vessel sailing beyond the Pillars of Hercules, with the motto, "Multi pertransibunt et augebitur scientia."

## NOTE 3.

Compare Aphorism LXXI.: "Scientiæ quas habemus, fere a Græcis fluxerunt. Quæ enim scriptores Romani aut Arabes aut recentiores addiderunt, non multa, aut magni momenti sunt; et, qualiacunque sint, fundata sunt super basin eorum quæ inventa sunt a Græcis. Erat autem sapientia Græcorum professoria, et in disputationes effusa: quod genus inquisitioni veritatis adversissimum. Itaque nomen illud sophistarum quod per contemptum, ab iis qui se philosophos haberi voluerunt, in antiquos rhetores rejectum et traductum est, Gorgiam, Protagoram, Hippiam, Polum: etiam universo generi competit, Platoni, Aristoteli, Zenoni, Epicuro, Theophrasto; et eorum successoribus, Chrysippo, Carneadi, reliquis. Hoc tantum intererat; quod prius genus vagum fuerit et mercenarium, civitates circumcursando, et sapientiam suam ostentando, et mercedem exigendo; alterum vero solennius et generosius, quippe eorum qui sedes fixas habuerunt, et scholas aperuerent et gratis philosophati sunt. Sed tamen utrumque genus (licet cetera dispar) professorium erat et ad disputationes rem deducebat, et sectas quasdam atque hæreses philosophiæ instituebat et propugnabat; ut essent fere doctrinæ eorum (quod non male cavillatus est Dionysius in Platonem) 'verba otiosorum senum ad imperitos juvenes. . . . . Etiam non omittendum videtur iudicium illud sive vaticinium potius sacerdotis Ægyptii de Græcis 'quod semper pueri essent, neque haberent antiquitatem scientiæ aut scientiam antiquitatis.' Et certe habent id quod puerorum est ut ad garriendum prompti sint, generare autem non possint; nam verbosa videtur sapientia eorum et operum sterilis."

It is, however, remarked by the author of the *Essay on Moral and Metaphysical Philosophy*, in the *Encycl. Metrop.*, that



“Bacon failed in the homage that was due to his great predecessors. He never sufficiently shewed in what sense Aristotle’s principles, though inapplicable to realities, were nevertheless true and necessary. He never fairly acknowledged, or, perhaps, perceived, that Plato, though he failed utterly in discovering the laws of nature, had asserted his own principle of knowing things in themselves, and traced out a method by which that knowledge was to be obtained, as clearly as Bacon himself.”

## NOTE 4.

The word “opera,” here translated “effects,” is of frequent occurrence in the philosophical writings of Bacon. It means useful practical applications of the theorems of science.

## NOTE 5.

Compare Aphorism LXXIV.: “Capienda etiam sunt signa (i. e. veritatis et sanitatis philosophiarum et scientiarum, vide Aphor. LXXVII.) ex incrementis et progressibus philosophiarum et scientiarum. Quæ enim in naturâ fundatæ sunt, crescunt et augentur; quæ autem in opinione, variantur, non augentur. Itaque si istæ doctrinæ plane instar plantæ a stirpibus suis revulsæ non essent, sed utero naturæ adhærent, atque ab eâdem alerentur, id minime eventurum fuisset, quod per annos bis mille jam fieri videmus: nempe, ut scientiæ suis hæreant vestigiis, et in eodem fere statu manerent, neque augmentum aliquid memorabile sumpserint; quin potius in primo auctore maxime floruerint, et deinceps declinaverint. In artibus autem mechanicis, quæ in naturâ et experientiæ luce fundatæ sunt, contra evenire videmus; quæ (quamdiu placent) veluti spiritu quodam repletæ, continuo vegetant et crescunt; primo rudes, deinde commodæ, postea excultæ, et perpetuo auctæ.”

In the “Cogitata et Visa,” he thus accounts for the different progress made in the Intellectual and in the Mechanical arts: “Neque aliam hujus contrarii successûs causam veriorem esse (cogitavit), quam quod in mechanicis multorum ingenia in unum coeunt; in philosophiâ autem singulorum ingenia ab uno quopiam destruuntur.”

## NOTE 6.

The argument from universal consent, is of frequent occurrence in the writings of almost all philosophers. For instance, Reid applies it to the establishment of first principles. Essay i. chap. 2. In one case, only, he thinks we may safely refuse authority to the universal agreement of ages and nations, and that is, if we can shew some prejudice as universal as that consent is, which might be the cause of it. "Where there is such universal consent in things not deep nor intricate, but which lie, as it were, on the surface, there is the greatest presumption that can be, that it is the natural result of the human faculties, and it must have great authority with every sober mind that loves truth. 'Major enim pars eo fere deferri solet quo a naturâ deducitur.' —*Cic. de Off.* i. 41." (He subsequently uses the same argument against the views of Berkeley and Hume. Essay ii. chap. 19.) To the obvious objection that it is impossible to collect the opinions of all men upon any point, he replies, that there are three ways by which we may ascertain them: from the tenor of men's conduct as observed by us; from the records of history; and from the structure of language. We find the same argument stated in a logical form by Velleius, to prove the existence of the gods (*Cic. de Nat. D. lib. i. chap. 17*); and Cotta (*chap. 23*) argues against it in a manner very similar to that of Bacon: "Quod (argumentum) cum leve per se, tum etiam falsum est; primum enim unde notæ tibi sunt opiniones nationum? Equidem arbitrator multas esse gentes sic immanitate efferatas ut apud eas nulla suspicio deorum sit . . . . . equidem existumo, tardiores ad hanc sententiam profitendam multos esse factos, quippe cum pœnam ne dubitatio quidem effugere potuisset." Another instance of the employment of this argument occurs in the *De Nat. D. lib. ii. 2*; and again in the *Tusculan Questions, lib. i. 13*, where we read: "Omni autem in re, consensio omnium gentium lex naturæ putanda est."

## NOTE 7.

Compare Aphorism LXXVII.: "Quod vero putant homines in

philosophiâ Aristotelis magnum utique consensum esse, . . . . . Illud etiam de consensu fallit homines, si acutius rem introspiciant. Verus enim consensus is est, qui ex libertate iudicii (re prius exploratâ) in idem conveniente consistit. At numerus longe maximus eorum qui in Aristotelis philosophiam consenserunt, ex præiudicio et auctoritate aliorum se illi mancipavit: ut sequacitas sit potius et coitio quam consensus. Quod si fuisset ille verus consensus et late patens, tantum abest, ut consensus pro verâ et solidâ auctoritate haberi debeat, ut etiam violentam præsumptionem inducat in contrarium. Pessimum enim omnium est augurium quod ex consensu capitur in rebus intellectualibus: exceptis divinis et politicis in quibus suffragiorum jus est. Nihil enim multis placet, nisi imaginationem feriat, aut intellectum vulgarium notionum nodis astringat, ut supra dictum est. Itaque optime traducitur illud Phocionis a moribus ad intellectualia ‘ ut statim se examinare debeant homines, quid erraverint aut peccaverint, si multitudo consentiat et complaudat.’” The pretence of *diuturnitas* he shews to be equally groundless: “Atque ipsam temporis diuturnitatem recte consideranti in angustias parvas redigi (cogitavit). Nam ex viginti quinque annorum centuriis, in quibus memoria hominum fere versatur, vix quinque centurias seponi, quæ scientiarum proventui utiles et feraces fuerint, easque ipsas longe maximâ ex parte aliis scientiis, non illâ de naturâ satas et cultas fuisse. Tres enim doctrinarum revolutiones et periodos numerari: unam apud Græcos, alteram apud Romanos, ultimam apud occidentales Europæ nationes: reliqua mundi tempora bellis et aliis studiis occupata, et quoad scientiarum segetem sterilia et vasta inveniri.”—*Cogitata et Visa*.

## NOTE 8.

These words are very applicable to Bacon’s great contemporary, Des Cartes. See, for some useful remarks on this subject, Reid, Essay ii. chap. 8.

## NOTE 9.

Compare Aphorism LXX.: “Sed demonstratio longe optima est

experientia. . . . At modus experiendi, quo homines nunc utuntur, cæcus est et stupidus. Itaque cum errant et vagantur nullâ viâ certâ, sed ex occurso rerum tantum consilium capiunt, circumferuntur ad multa sed parum promovent; et quandoque gestiunt, quandoque distrahuntur; et semper inveniunt quod ulterius quærant. Fere autem ita fit, ut homines leviter et tanquam per ludum experiantur, variando paululum experimenta jam cognita; et, si res non succedat, fastidiendo et conatum deserendo. Quod si magis serio et constanter ac laboriose ad experimenta se accingant; tamen in uno aliquo experimento eruendo operam collocant; quemadmodum Gilbertus in magnete, chemici in auro. Hoc autem faciunt homines, instituto non minus imperito, quam tenui. Nemo enim alicujus rei naturam in ipsâ re feliciter perscrutatur; sed amplianda est inquisitio ad magis communia." In consequence of these errors of the old experimental inquirers, Bacon classes among the Desiderata, and illustrates at considerable length, in his fifth book De Augmentis, the *Experientia Literata*, or the *Ars Indicii ab Experimentis ad Experimenta*.

## NOTE 10.

Locke thinks the use of syllogism is positively mischievous in some cases, as in arguments of probability, and in mathematical demonstrations. In the former, it often confounds the connexion; and in the latter, the knowledge gained thereby comes shortest and clearest without syllogisms. Dugald Stewart objects to the syllogistic theory, first, that it is an attempt to demonstrate, by abstract reasoning, the conclusiveness of demonstration: second, that it does not carry the mind forward a single step, from one truth to another, but merely from a *general axiom* to some of its particular exemplifications: third, that it carries the mind in a direction *opposite* to that in which its judgments are necessarily formed: and fourth, that the intellectual habits which the study of it has a tendency to form are not of great importance. He admits, however, that a general acquaintance with it is justly regarded as an essential accomplishment to those who are liberally educated.

Brown conceives that it trains the mind to two of the most

dangerous practical errors,—the errors of admitting without proof only what requires proof; and of doubting, that is to say, of requiring proof, only of what is evident; these he imagines to be the *direct* hurtful consequence of this art. In the same Lecture (L.), he enumerates what he calls its indirect hurtful influences. Brown, however, with many other writers (particularly those of the Scotch school, Reid, Campbell, &c.), seems to have entirely misconceived the nature and object of the syllogistic theory, as is satisfactorily shewn in Whately's Logic. Archbishop Whately well remarks, that the strong terms in which Bacon sometimes appears to censure logical pursuits may be accounted for by the circumstance of the schoolmen utterly mistaking the true nature and object of Logic, and attempting to employ it for the purpose of physical inquiry: but that this censure was intended to bear against the extravagant perversions, not the legitimate cultivation, of the science, may be proved from his own observations on the subject, in his Advancement of Learning.

## NOTE 11.

Stewart remarks that when Lord Bacon speaks of the School Logic “as answering well enough in civil affairs, and the arts which consist in talk and opinion,” his words can only apply to dialectical syllogisms, and cannot possibly be extended to those which Aristotle calls demonstrative. (An explanation of these terms may be found in Stewart's Philosophy of the Human Mind. Part. ii. chap. 3). “If there be any parts of science in which the syllogism can be advantageously applied, it must be those where our judgments are formed in consequence of an application to particular cases of certain maxims which we are not at liberty to dispute. An example of this occurs in the practice of law. Here the particular conclusion must be regulated by the general principle, whether right or wrong. The case was similar in every branch of philosophy, as long as the authority of great names prevailed, and the old scholastic maxims were allowed, without examination, to pass as incontrovertible truths.”

—Stewart.

## NOTE 12.

Mr. Craik translates this sentence thus: "Never withdraw our understanding hence for a longer space than is sufficient to allow the images and beams of things (as happens in the senses) to meet and concentrate," with the following explanation, "that is, apparently, to meet and arrange themselves into a distinct representation in the understanding, in the same manner as they do when conveying impressions to the senses. According to this interpretation, the images, and beams or rays, both express nearly the same thing,—the emanations figuratively supposed to proceed from the objects, by which they make themselves to be perceived by the senses and the mind. Mr. Wood's translation in Mr. Montagu's edition is: 'We abstract our understanding no further from them (things) than is necessary to prevent the confusion of the images of things with their radiation, a confusion similar to that we experience by our senses.' But this is plainly the very opposite of what the Latin states. *Ut possint coire* can never mean 'to prevent the confusion.' Even if the *imagines* and the *radii* are to be understood as different, the translation of the clause must be, 'that they *may* come together,' not 'that they may not be mingled or confused.'"

## NOTE 13.

Compare Aphorism xcv.: "Qui tractaverunt scientias, aut empirici, aut dogmatici fuerunt. Empirici, formicæ more, congerunt tantum et utuntur: rationales, araneorum more, telas ex se conficiunt: apis vero ratio media est, quæ materiam ex floribus horti et agri elicit, sed tamen eam propriâ facultate vertit et digerit. Neque absimile philosophiæ verum opificium est; quod nec mentis viribus tantum aut præcipue nititur, neque ex historiâ naturali et mechanicis experimentis præbitam materiam, in memoriâ integram, sed in intellectu mutatam et subactam, reponit. Itaque ex harum facultatum (experimentalis scilicet et rationalis) arctiore et sanctiore fœdere (quod adhuc factum non est) bene sperandum est."

The following passage well illustrates the aphorism quoted above: "The extremes of human knowledge may be considered as founded, on the one hand, purely upon reason, and on the other, purely on sense. Now, a very large portion of our knowledge, and what in fact may be considered as the most important part of it, lies between these two extremes, and results from a union or mixture of them, that is to say, consists of the application of rational principles to the phenomena presented by the objects of nature."—*Prout's Bridgewater Treatise*, p. 2. Compare Archbishop Whately's reasonings on the two kinds of Discovery.—*Logic*, book iv. chap. 2, § 2.

## NOTE 14.

Compare Aphorism LXXXIX.: "Denique invenias ex quorundam theologorum imperitiâ aditum alicui philosophiæ, quamvis emendatæ, pene interclusum esse. Alii siquidem simplicius subverentur, ne forte altior in naturam inquisitio ultra concessum sobrietatis terminum penetret; traduentes et perperam torquentes ea quæ de divinis mysteriis in Scripturis sacris adversus rimantes secreta divina dicuntur, ad occulta naturæ, quæ nullo interdicto prohibentur. Alii callidius conjiciunt et animo versant, si media ignorentur, singula ad manum et virgulam divinam (quod religionis, ut putant, maxime intersit) facilius posse referri; quod nihil aliud est quam 'Deo per mendacium gratificari' velle. Alii ab exemplo metuunt ne motus et mutationes circa philosophiam in religionem incurrant ac desinant. Alii denique solliciti videntur, ne in naturæ inquisitione aliquid inveniri possit, quod religionem (præsertim apud indoctos) subvertat aut saltem labefactet. At isti duo posteriores metus nobis videntur omnino sapientiam animalem sapere; ac si homines in mentis suæ recessibus et secretis cogitationibus, de firmitudine religionis, et fidei in sensum imperio, diffident ac dubitent; et propterea ab inquisitione veritatis in naturalibus periculum illis impendere metuerent. At vere rem reputanti, philosophia naturalis, post verbum Dei, certissima superstitionis medicina est; eademque probatissimum fidei alimentum. Itaque merito reli-

gioni donatur tanquam fidissima ancilla: cum altera voluntatem Dei, altera potestatem, manifestet. Neque enim erravit ille, qui dixit: 'Erratis, nescientes Scripturas et potestatem Dei,' informationem de voluntate, et meditationem de potestate, nexu individuo commiscens et copulans." There is a striking passage to the same effect in the first book *De Augmentis*: "Eos, qui autumant nimiam scientiam inclinare mentem in atheismum, ignorantiamque causarum secundarum pietati erga primam obstetricari, libenter compellarem Jobi quæstione: 'An oporteat mentiri pro Deo, et ejus gratiâ dolum loqui conveniat, ut ipsi gratificemur?' Liquet enim, Deum nihil operari ordinario in naturâ, nisi per secundas causas, cujus diversum credi si vellent, impostura mera est, quasi in gratiam Dei, et nihil aliud quam auctori veritatis immundam mendacii hostiam immolare. Quin potius certissimum est, atque experientiâ comprobatum, leves gustus in philosophiâ movere fortasse ad atheismum, sed pleniore haustus ad religionem reducere. Namque in limine philosophiæ, cum secundæ causæ tanquam ingerant se menti humanæ, mensque ipsa in illis hæreat et commoretur, oblivio primæ causæ obrepere possit: sin quis ulterius pergat, causarumque seriem et concatenationem intueatur, tunc, secundum poetarum mythologiam, facile credet summum naturalis catenæ anulum pedi solii Jovis affigi." In the same book he marks out three limits ("tres limites") to the pursuit of human knowledge: "Primus, ne ita felicitatem collochemus in scientiâ, ut interim mortalitatis nostræ oblivio subrepat. Secundus, ne sic utamur scientiâ, ut anxietatem pariat, non animi tranquillitatem. Tertius, ne putemus, posse nos per naturæ contemplationem mysteria divina assequi." He elsewhere observes: "There are two principal services besides ornament and illustration, which philosophy and human learning perform to religion; the one consists in effectually exciting to the exaltation of God's glory, the other affording a singular preservative against unbelief and error."

In Dr. Wiseman's Twelfth Lecture on the Connexion between Science and Revealed Religion, he ably shews that so far is reli-



gion from being opposed to human learning, that it is deeply interested in the progress of every science. Space will not permit me to extract some of his eloquent observations.

## NOTE 15.

“Meta autem scientiarum vera et legitima non alia est quam ut dotetur vita humana novis inventis et copiis.”—*Aphor. LXXXI.* Yet he elsewhere declares that the noblest end of philosophy is the discovery of truth; thus, *Aphor. cxxiv.*: “Occurret et illud: nec metam aut scopum scientiarum a nobis ipsis (id quod in aliis reprehendimus) verum et optimum præfixum esse. Esse enim contemplationem veritatis, omni operum utilitate et magnitudine digniorem et celsiorem. . . . *Nos vero huic rationi libenter assentimur.*” Again, *Aphor. cxxix.*: “Ipsa contemplatio rerum, prout sunt, sine superstitione aut imposturâ, errore, aut confusione, in se ipsâ magis digna est, quam universus inventorum fructus.” But compare note 3, book vii.

## NOTES ON THE DISTRIBUTION OF THE WORK.

## NOTE 1.

For some valuable observations on the relation between the Organon of Bacon and that of Aristotle, see Whately's Logic, iv. chap. 1. *See page 224 infra*

As the subject will be of frequent recurrence, a few general remarks on Bacon's Inductive Method may not be out of place here. Mr. Mill shortly defines Induction as Generalization from Experience. It is a criterion of a real Induction, according to this eminent writer, that it should proceed from the known to the unknown; and any process in which what seems the conclusion is no wider than the premises from which it is drawn, does not fall within the meaning of the term. This distinguishes it from what is laid down in the common books of logic, as the

most perfect form of Induction. In those books every process which sets out from a less general, and terminates in a more general expression, is called an Induction, whether anything be really concluded or not; and the Induction is asserted to be not perfect, unless what we affirm of the class has already been ascertained to be true of every individual in it, so that the nominal conclusion is not really a conclusion, but a mere re-assertion of the premises. It is also distinct from mathematical Induction. See, for some further remarks on this subject, Mill's System of Logic, book iii. chap. 2.

It has been attempted by several writers to dispute Bacon's claim to the introduction of the Inductive Method, which, they say, was fully known to Aristotle. But Stewart asserts that their methods had nothing in common but the name, and that we might as well argue from the mention of attraction in the writings of the ancients, that they were acquainted with the Newtonian system of astronomy. Bacon has aided the misconception on this subject, by retaining the name Induction. This arose from his partiality to old terms ("nobis vero," he says, "quibus, quantum calamo valemus, inter vetera et nova in literis fœdus et commercium contrahere, cordi est, decretum manet, antiquitatem comitari usque ad aras, atque vocabula antiqua retinere, quanquam sensum eorum et definitiones sæpius immutemus"), a remarkable instance of which we have in his use of the word "formæ." In proof of his statement, Stewart adduces the following passages, which seem conclusive: "In constituendo autem axiomatico, forma inductionis alia quam adhuc in usu fuit, excogitanda est. Inductio enim quæ procedit per enumerationem simplicem res puerilis est, et precario concludit. At inductio, quæ ad inventionem et demonstrationem scientiarum et artium erit utilis, naturam separare debet, per rejectiones et exclusiones debitas; ac deinde post negativas tot quot sufficiunt, super affirmativas concludere; quod adhuc factum non est, nec tentatum certe, nisi tantummodo a Platone, qui ad excutiendas definitiones et ideas, hæc certe formâ inductionis aliquatenus utitur. Verum ad hujus inductionis, sive demonstrationis instruc-

tionem bonam et legitimam, quamplurima adhibenda sunt, quæ adhuc nullius mortalium cogitationem subiere; adeo ut in eâ major sit consumenda opera, quam adhuc consumpta est in syllogismo."—*Nov. Org.* lib. i. Aphor. cv. "Cogitavit et illud . . . . . Restare inductionem, tanquam ultimum et unicum rebus subsidium et perflugium. Verum et hujus nomen tantummodo notum esse, vim et usum homines hactenus latuisse."—*Cogitata et Visa*. Stewart also cites Aristotle's definition of Induction, viz.: "Induction is an inference drawn from all the particulars which it comprehends;" remarking: "It is manifest upon this occasion Aristotle speaks of that Induction which Bacon, in one of the extracts quoted above, describes as proceeding by simple enumeration, and which he, therefore, pronounces to be 'a puerile employment of the mind, and a mode of reasoning leading to uncertain conclusions.'"

Mr. Macaulay (in *Edinburgh Review*, July, 1837) not only denies Bacon's claim to the invention of the Inductive Method, but asserts that he was not even the first who correctly analysed that method and explained its uses. "The Inductive Method," he says, "has been practised ever since the beginning of the world by every human being. It is constantly practised by the most ignorant clown, by the most thoughtless school-boy, by the very child at the breast," &c. The answer to this is, that Induction being the type of reasoning, of course so long as men have reasoned they have reasoned inductively; and that this was clearly seen by Bacon, appears from a passage in *Book v. chap. ii.*: "Reperiet profecto animum suapte sponte, et nativâ indole, inductionem solertius conficere, quam quæ describitur a dialecticis," &c., &c. But we should not confound ordinary Induction with scientific Induction, or a simple *inference* with a long and complicated process of reasoning. (See *Lewes' Hist. of Phil.* vol. iii., *Hallam's Hist. of Lit. of Europe*, vol. iii. page 182, and *Herschel's Discourse on Nat. Phil.* (105)). "Those who deny Bacon's claim to the invention of the new method" (says Mr. Lewes), "confound what Bacon incessantly and emphatically distinguishes, viz., *Induction* with the *Inductive Method*. Although

*Induction*, as the type of reasoning, must be carried on by every reasoning animal, yet so far is the *Inductive Method* from being the ordinary process of ordinary men, that we know of scarcely any process *so contrary* to the natural bias of the mind."—*Biograph. Hist. of Phil.* vol. iii.

The opinion of Archbishop Whately, that Induction is but a peculiar case of ratiocination, and that the universal type of all inference or reasoning is the syllogism, is ably controverted by Mr. Mill, who holds a view directly opposite. Instead of resolving Induction into Ratiocination, he regards Ratiocination as itself resolvable into Induction. The reasoning by which he supports his view is as follows: "By throwing the whole course of any inductive argument into a series of syllogisms, we arrive, by more or fewer steps, at an ultimate syllogism, which will have for its major premiss the principle, or axiom, of the uniformity of the course of nature. But whence came this universal major? What proves that nature is governed by general laws? Where are the premises of the syllogism, of which this is the conclusion? *Here at least is a case of Induction which cannot be resolved into syllogism.* Archbishop Whately's theory, therefore, which implies the consequence that we never could have had a single well-grounded induction, unless we had already reached the highest generalization, must be regarded as untenable." So far Mr. Mill.

To this argument the following reply is given in the last edition of Archbishop Whately's Logic. "It has been urged that what are described as the major premises in drawing inferences from Inductions, are resolvable, ultimately, into an assertion of the 'uniformity of the laws of nature,' or some equivalent proposition; and that this is, itself, obtained by *Induction*; whence it is concluded, that there must be, at least, *one* Induction, and that, the one on which all others depend, incapable of being exhibited in a syllogistic form. But it is evident, and is universally admitted, that in *every* case where an inference is drawn from Induction (unless that name is to be given to a mere random guess, without any grounds at all), we must form a judgment

that the instance or instances adduced are “*sufficient* to authorize the conclusion;” that it is “*allowable*” to take these instances as a sample warranting an inference respecting the whole class. Now the expression of this judgment in words, is *the very major-premiss* alluded to. To acknowledge this, therefore, is to acknowledge that all reasoning from Induction *without exception*, does admit of being exhibited in a syllogistic form; and consequently, that to speak of one Induction that does *not* admit of it, is a contradiction.

“Whether the belief in the constancy of nature’s laws,—a belief of which no one can divest himself,—be intuitive, and a part of the constitution of the human mind, as some eminent metaphysicians hold, or acquired, is a question foreign to our present purpose. For *that*, it is sufficient to have pointed out that the necessity of assuming a universal major-premiss, expressed or understood, in order to draw any legitimate inference from Induction, is virtually acknowledged even by those who endeavour to dispute it.”

## NOTE 2.

The necessity of these “aids for the understanding” is insisted on by most philosophers. Locke (quoting the authority of Hooker, book iv. chap. 17) recommends them to be sought for. So also Stewart (Introduction to Philosophy of the Human Mind), who thus indicates what ought to form the subjects of a rational and useful logic:—1. To exhibit a precise and steady idea of the objects of scientific inquiry; and 2. To lay down the rules of investigation which it is proper to follow in the different sciences.

## NOTE 3.

Hence Stewart makes it a subject of bitter complaint against logic, that it presupposes the most difficult part of the logical process to be accomplished, namely, the ascertaining of the meaning of ambiguous words. This objection is both unreasonable and inconsistent with a subsequent statement of his own, as may be seen in Whately’s Logic, book iii. sect. 3.

## NOTE 4.

Compare Aphorism xvii.: "Nec minor est libido et aberratio in constituendis axiomatibus, quam in notionibus abstrahendis; idque in ipsis principiis, quæ ab inductione vulgari pendent. At multo major est in axiomatibus, et propositionibus inferioribus, quæ educit syllogismus." Mr. Lewes remarks that, "if every induction can be thrown into the form of a syllogism by supplying the major-premiss, it is in the way this major-premiss is established that we must seek the real difference between the Syllogistic and Inductive Methods; and that difference is the difference between a *priori* and a *posteriori*. Every one who has read Bacon knows that his scorn for the syllogism is not scorn for it as a form of *rationation*, but as a means of investigation. He objects to proceeding to deduce, from an axiom not accurately and inductively obtained, consequences which may very well be contained in the axiom, but yet have no relation to the truth of things."

NOTE 5. *see note 15*

In Aphor. lxix. he enumerates four steps, and as many errors, in the processes universally employed in deducing conclusions and axioms from things and perceptions: "Universus ille processus, qui a sensu et rebus ducit ad axiomata et conclusiones quadruplex est, et vitia ejus todidem. Primo impressiones sensûs ipsius vitiosæ sunt, sensus enim et destituit et fallit. At de substitutionibus substitutiones, fallaciis rectificationes debentur. Secundo, notiones ab impressionibus sensuum male abstrahuntur; et interminatæ et confusæ sunt, quas terminatas et bene finitas esse oportuit. Tertio, inductio mala est, quæ per enumerationem simplicem principia concludit scientiarum, non adhibitis exclusionibus, et solutionibus, sive separationibus naturæ debitæ. Postremo, modus ille inveniendi et probandi, ut primo principia maxime generalia constituentur, deinde media axiomata ad ea applicentur et probentur, errorum mater est et scientiarum omnium calamitas."

Compare Aphorism xix.: "Duæ viæ sunt, atque esse possunt,

ad inquirendam et inveniendam veritatem. Altera a sensu et particularibus advolat ad axiomata maxime generalia, atque ex iis principiis eorumque immotâ veritate judicat et invenit axiomata media: atque hæc via in usu est. Altera a sensu et particularibus excitat axiomata, ascendendo continenter et gradatim, ut ultimo loco perveniatur ad maxime generalia; quæ via vera est, sed intentata." Also Aphor. civ.: "De scientiis tum demum bene sperandum est, quando per scalam veram et per gradus continuos, et non intermissos aut hiulcos, a particularibus ascendatur ad axiomata minora, et deinde ad media, alia aliis superiora, et postremo demum ad generalissima. Etenim axiomata infima non multum ab experiienti nudâ discrepant. Suprema vero illa et generalissima (quæ habentur) notionalia sunt, et abstracta, et nil habent solidi. At media sunt axiomata illa vera, et solida, et viva, in quibus humanæ res et fortunæ sitæ sunt; et supra hæc quoque tandem ipsa illa generalissima; talia scilicet, quæ non abstracta sint, sed per hæc media vere limitantur. Itaque hominum intellectui non plumæ addendæ, sed plumbum potius et pondera; ut, cohibeant omnem saltum et volatum."

On Bacon's view of generalization, as exhibited in this passage, Mr. Mill observes: "Bacon has judiciously observed that the *axiomata media* of every science principally constitute its value. . . . But I conceive him to have been radically wrong in his doctrine respecting the mode in which these *axiomata media* should be arrived at; although there is no one proposition laid down in his works for which he has been so extravagantly eulogized. He enunciates, as an universal rule, that induction should proceed from the lowest to the middle principles, and from those to the highest, never reversing that order, and, consequently, leaving no room for the discovery of new principles by way of deduction at all. It is not to be conceived that a man of Bacon's sagacity could have fallen into this mistake, if there had existed, in his time, among the sciences which treat of successive phenomena, one single instance of a deductive science, such as mechanics, astronomy, optics, acoustics, &c., now are. In those sciences it is evident that the higher and middle principles are by no means

derived from the lowest, but the reverse. In some of them the very highest generalizations were those earliest ascertained with any scientific exactness; as, for example (in mechanics), the laws of motion. Bacon's greatest merit cannot, therefore, consist, as we are often told that it did, in exploding the vicious method pursued by the ancients, of flying to the highest generalizations first, and deducing the middle principles from them, since this is neither a vicious, nor an exploded, but the universally accredited method of modern science, and that to which it owes its greatest triumphs. The error of ancient speculation did not consist in making the largest generalizations first, but in making them without the aid or warrant of rigorous inductive methods, and applying them deductively without the needful use of that important part of the deductive method, termed Verification." In fact, Bacon's unjust depreciation of deduction as a method of scientific inquiry seems to be his capital error. "The radical defect of Bacon's method," says Mr. Lewes, "is, being solely *inductive*, and not also *deductive*. He was so deeply impressed with a sense of the insufficiency of the Deductive Method alone, which he saw his contemporaries pursuing, and which he knew to be the cause of the failure of his predecessors, that he bestowed all his attention on the Inductive Method. His want of mathematical knowledge had also no small share in this. Although, however, it may be justly said, that he did not sufficiently exemplify the Deductive Method, it is not correct to say that he entirely neglected it. Those who assert this, forget that the second part of the *Novum Organum* was never completed. In the second part it was his intention to treat of Deduction, as is plain from the following passage: 'Indicia de interpretatione naturæ complectuntur partes in genere duas; primam, de educendis aut excitandis axiomatibus ab experientiâ; secundam, de *deducendis aut derivandis experimentis novis ab axiomatibus.*'"

## NOTE 6.

"By axiom," says Stewart, "Bacon meant a general principle obtained by induction, from which we may safely proceed to rea-



son synthetically." Stewart conceives that Bacon's use of the term "axiom," in this sense, led Newton to apply it to the laws of motion, and those general facts which form the basis of our reasoning in optics. "The first principles of natural philosophy are of a quite different nature from mathematical axioms; they have not the same kind of evidence, nor are they necessary truths, as mathematical axioms are; they are such as these: that similar effects proceed from the same or similar causes; that we ought to admit of no other causes of natural effects, but such as are true, and sufficient to account for the effects."—*Reid*, Essay i. chap. 2. On this subject consult Stewart's reasonings, Phil. of Hum. Mind. part ii. chap. 1.

With respect to the axioms formed by his method of induction, Bacon (Aphor. cvl.) suggests an important inquiry: "In axiomatibus constituendis per hanc inductionem, examinatio et probatio etiam facienda est, utrum quod constituitur axioma aptatum sit tantum et ad mensuram, factum eorum particularium, ex quibus extrahitur; an vero sit amplius et latius. Quod si sit amplius aut latius, videndum, an eam suam amplitudinem et latitudinem, per novorum particularium designationem, quasi fidejussione quâdam firmet; ne vel in jam notis tantum hæreamus, vel laxiore fortasse complexu umbras et formas abstractas, non solida et determinata in materiâ, preensemus."

## NOTE 7.

What Locke, speaking of a kindred subject, calls "creatures of the understanding rather than the works of nature." "Notions, as by a peculiar right appertaining to the understanding."

## NOTE 8.

This kind of induction, "per simplicem enumerationem," is that which unscientific minds naturally employ. Mr. Mill mentions two false opinions which might be fairly inferred by this sort of induction, viz.: "To an inhabitant of Central Africa, fifty years ago, no fact, probably, appeared to rest on more uniform experience, than this, that all human beings are black. To

Europeans, not many years ago, the proposition, all swans are white, appeared an equally unequivocal instance of uniformity in the course of nature. Further experience has proved to both that they were mistaken." Induction by simple enumeration will, in some cases, amount to full proof, if it can be shewn that, if there were in nature any contradictory instances, we should have known them. This sort of induction is, according to Mr. Mill, still the current and approved mode of reasoning in the moral and political sciences. "Of this a very few instances, more by way of memento, than of instruction, may suffice. What, for example, is to be thought of all the 'common-sense' maxims for which the following may serve as the universal formula: 'Whatsoever has never been will never be.' As, for example, negroes have never been as civilized as whites sometimes are, therefore it is impossible they should be so. Women, as a class, have not hitherto equalled men, as a class, in intellectual energy and comprehensiveness, therefore they are necessarily inferior. Society cannot prosper without this or the other institution, e.g., in Aristotle's time, without slavery. One working man in a thousand, educated, while the other nine hundred and ninety-nine remain uneducated, has usually aimed at raising himself out of his class, therefore, education makes people dissatisfied with their condition in life. Bookish men taken from speculative pursuits, and set to work on something they know nothing about, have generally been found, or thought, to do it ill, therefore philosophers are unfit for business, &c., &c. All these are inductions by simple enumeration. Reasons, having some reference to the canons of scientific investigation, may have been given, or attempted to be given, for several of these propositions; but to the multitude of those who parrot them, the *enumeratio simplex, ex his tantummodo quæ præsto sunt pronuncians*, is the sole evidence. Their fallacy consists in this, that they are inductions without elimination; there has been no real comparison of instances, nor even ascertainment of the material circumstances in any given instance." Bacon's emphatic denunciation of this rude

and slovenly mode of generalization is, in Mr. Mill's opinion, the most important part of the permanent service rendered by him to philosophy.

A *single* instance is in some cases sufficient for a complete induction: when a chemist announces the existence and properties of a new substance, we are sure that his conclusions will hold universally, if we have confidence in his accuracy.

## NOTE 9.

"Precario concludit," Mr. Mill translates, "concludes only *by your leave*, or provisionally," meaning thereby, in the absence of means of more searching investigation.

## NOTE 10.

Compare Aphor. xxv.: "Si forte instantia aliqua, non prius animadversa aut cognita, se offerat, axioma distinctione aliqua frivola salvatur, ubi emendari ipsum verius foret."

## NOTE 11.

"Usual," i. e., true for the most part.

## NOTE 12.

Compare Aphor. cv.: "Inductio, quæ ad inventionem et demonstrationem scientiarum et artium erit utilis, naturam separare debet, per rejectiones et exclusiones debitas; ac deinde post negativas tot quot sufficiunt, super affirmativas concludere; quod adhuc factum non est, nec tentatum certe, nisi tantummodo a Platone, qui ad excutiendas definitiones et ideas, hæc certe formæ inductionis aliquatenus utitur." See also Aphor. xv. Nov. Org. lib. ii.: "Deo (formarum inditori et opifici) aut fortasse angelis et intelligentiis competit, formas per affirmationem immediate nosse, atque ab initio contemplationis. Sed certe supra hominem est; cui tantum conceditur, procedere primo per *negativas*, et postremo loco desinere in *affirmativas*, post omnimodam exclusionem." The process here alluded to has been termed by recent logicians *elimination*. "This term," says Mr. Mill, "(which is employed in the theory of equations to denote the

process by which one after another of the elements of a question is excluded, and the solution made to depend upon the relation between the remaining elements only), is well suited to express the operation analogous to this, which has been understood, since the time of Bacon, to be the foundation of experimental inquiry, namely, the successive exclusion of the various circumstances which are found to accompany a phenomenon in a given instance, in order to ascertain what are those among them which can be absent consistently with the existence of the phenomenon."—Book iii. chap. 8. The same author mentions what he considers Bacon's capital error in his view of Inductive Philosophy, viz., his supposition that the principle of elimination (that great logical instrument which he had the immense merit of first bringing into use) was applicable, in the same sense, and in the same unqualified manner, to the investigation of *coexistences*, as to that of the *successions of phenomena*.—Book iii. chap. 22.

## NOTE 13.

Locke, when pointing out the danger of building our systems of philosophy on precarious principles, uses very similar language: "That which I have here to do is to inquire whether, if it be the readiest way to knowledge, to begin with general maxims, and build upon them, it be yet a safe way to take the principles which are laid down in any other science as unquestionable truths, and so receive them without examination, and adhere to them without suffering them to be doubted, &c."—Book iv. Chap. 12.

## NOTE 14.

Stewart notices an ambiguity in the use of the term *principle* in eminent writers. In its proper acceptation it denotes, he says, an assumption (whether resting on fact or hypothesis), upon which, as a datum, a train of reasoning proceeds; and for the falsity or incorrectness of which no logical rigour in the subsequent process can compensate. Thus the gravity and elasticity of the air, and the equality of the angles of incidence and reflection in physical science, and in an analogous sense the definitions

of geometry. On other occasions the word is used to denote those elemental truths which are virtually assumed in every step of our reasoning, and without which, although no consequences can be directly inferred from them, a train of reasoning would be impossible. Of this kind, in mathematics, are the axioms, or (as Locke calls them) the maxims; in physics, a belief in the continuance of the laws of nature; in all our reasonings a belief in our identity and memory. It is to truths of this description that Locke in general seems to apply the name of maxims; and in this sense it is unquestionably true that no science is founded on maxims as its first principles." To remove the ambiguity, Stewart employs two terms, "principles of reasoning" and "elements of reasoning:" from the former consequences may be deduced; from the latter none ever can.

## NOTE 15.

From this passage it appears that Bacon assigned a wider province to logic than Archbishop Whately. For of the three sources of error in an argument (namely, *false or doubtful premises, indistinct or ambiguous terms, and the form of expression*), Dr. Whately thinks that logic has to do with the last alone. Bacon here brings the first under its control; and many passages in the Fifth Book of "the Advancement" shew that he extended it to the second also. The Archbishop, however, remarks that, though the rules of logic cannot, alone, clear up ambiguity in any term, yet they do point out in *which* term of an argument it is to be sought for, directing our attention to the *middle* term as the likely one; and subsequently (book iv. chap. 1. sect. 1) adds, that the rules of logic are concerned with the truth or falsity of the premises when they are the *conclusions* of former arguments.

## NOTE 16.

From an analysis of the operations of our senses, Reid thus shews that they are not fallacious. There cannot be any fallacy in sensation; for we are conscious of all our sensations, and they can neither be any other in their nature, nor greater or less in their degree, than we feel them. If, therefore, there be any fal-

lacy in our senses, it must be in the perception of external objects; perception may be *disordered*, and is *imperfect*; so may our imagination, memory, &c., but we do not call these faculties *fallacious*. He mentions four classes of errors commonly ascribed to the fallacies of the senses. First, conclusions rashly drawn from the testimony of the senses; secondly, errors to which we are liable in our acquired perceptions; thirdly, errors from ignorance of laws of nature; fourthly, those which proceed from disordered organs. See Essay ii. chap. 22. (It may be observed that Reid's representation of the opinions of the ancient philosophers on this subject is very incorrect: thus, he says that the Epicureans taught the fallaciousness of the senses; in disproof of which see Cic. de Nat. D. lib. i. 25; de Fin. i. 7; and Luc. 25; he also misstates the Aristotelic doctrine. See Reid's Inquiry, chap. vi. sect. 23). Mr. Mill acutely remarks that "the sole condition, that what is supposed to be observed shall really have been observed, is, that it be an *observation*, not an *inference*. For in almost every act of our perceiving faculties, observation and inference are intimately blended. What we are said to observe is usually a compound result, of which one-tenth may be observation, and the remaining nine-tenths inference. I affirm, for example, that I hear a man's voice. This would pass, in common language, for a direct perception. All, however, which is really perception, is, that I hear a sound. That the sound is a voice, and that voice the voice of a man, are not perceptions, but inferences." "Innumerable instances might be given and analyzed in the same manner, of what are vulgarly called errors of sense. These are none of them properly errors of sense; they are *erroneous inferences from sense*." See also Lewes' Biographical History of Philosophy, vol. ii. p. 119.

## NOTE 17.

Compare Locke, book iv. 3. 24. "These (ways of operation) are hid from us in some things by being too *remote*, and in others by being too *minute*." See his reasons why motions very slow or very swift are not perceived; book ii. chap. 14. 7, 8. He also

gives a remarkable instance of *habit* altering the ideas of sensation; book ii. chap. 9. 8.

## NOTE 18.

The meaning of this expression is obvious enough, though it is not easily conveyed in a translation. It refers to the effect which the laws of the percipient being have in modifying the notions he receives of external existences. Our knowledge of things, as a modern psychologist would say, is altogether *subjective*.

## NOTE 19.

See Reid, Essay ii. chap. 21, On the Improvement of the Senses.

## NOTE 20.

Compare Aphor. L.: "Sed omnis verior interpretatio naturæ conficitur per instantias, et experimenta idonea et apposita; ubi sensus de experimento tantum, experimentum de naturâ et re ipsâ judicat."

## NOTE 21.

"These *idola*, εἰδωλα, images, illusions, fallacies, or, as Lord Bacon calls them in the Advancement of Learning, false appearances, have been often named in English, *idols* of the tribe, of the den, of the market-place. But it seems better, unless we retain the Latin name, to employ one of the synonymous terms given above. For the use of *idol* in this sense is little warranted by the practice of the language, nor is it found in Bacon himself; but it has misled a host of writers, whoever might be the first that applied it, even among such as are conversant with the *Novum Organum*. 'Bacon proceeds,' says Playfair, 'to enumerate the causes of error, the *idols*, as he calls them, or false divinities, to which the mind had been so long accustomed to bow.' And with a similar misapprehension of the word in speaking of the *idola specus*, he says: 'Besides the causes of error which are common to all mankind, each individual, according to Bacon, has his own dark cavern or den, into which the light is imperfectly admitted, and in the obscurity of which a tutelary idol lurks, at

whose shrine the truth is often sacrificed.' Thus also, Dr. T. Brown: 'In the inmost sanctuaries of the mind were all the idols which he overthrew.' And a later author on the *Novum Organum* fancies that Bacon 'strikingly, though in his usual quaint style, calls the prejudices that check the progress of the mind by the name of idols, because mankind are apt to pay homage to them instead of regarding truth.' Thus also, in the translation of the *Novum Organum* in Mr. Basil Montagu's edition, we find '*idola*' rendered by 'idols' without explanation. We may, in fact, say that this meaning has been almost universally given by later writers. By whom it was introduced I am not able to say. Cudworth, in a passage where he glances at Bacon, says: 'It is no *idol of the den*, to use that affected language.' But in the pedantic style of the seventeenth century, it is not impossible that idol may have been put as a mere translation of the Greek *εἰδωλον*, and in the same general sense of idea or intellectual image. Although the popular sense would not be inapposite to the general purpose of Bacon in this first part of the *Novum Organum*, it cannot be reckoned so exact and philosophical an illustration of the sources of human error, as the unfaithful image, the shadow of reality seen through a refracting surface or reflected from an unequal mirror, as in the Platonic hypothesis of the cave, wherein we are placed with our back to the light, to which he seems to allude in his *idola specûs*."—*Hallam*. Notwithstanding these remarks, which are undoubtedly correct, I have thought it advisable to retain the generally-received translation, on account of the frequent occurrence of the word "idol" in this peculiar sense in philosophic writings.

## NOTE 22.

Compare Aphor. XL.: "Excitatio notionum et axiomatum per *inductionem* veram, est certe proprium remedium ad *idola* ar-cenda et summovenda; sed tamen *indicatio idolorum* magni est usûs. Doctrina enim de *idolis* similiter se habet ad *interpretationem naturæ*, sicut doctrina de sophisticis elenchis ad dialecticam vulgarem."



## NOTE 23.

Compare Aphor. LI: "Melius autem est naturam *secare*, quam abstrahere; id quod Democriti schola fecit, quæ magis penetravit in naturam quam reliquæ."

## NOTE 24.

In Aphor. xcviII. he illustrates the acceptance of an unauthenticated natural history as a basis of philosophy, by the case of a state which would direct its councils and affairs according to the tattle of city and street politicians, instead of the letters and reports of ambassadors and messengers worthy of credit. If any one should object, that he speaks too depreciatingly of the labours of Aristotle and other natural historians, he replies thus: "Alia est ratio naturalis historiæ, quæ propter se confecta est; alia ejus, quæ collecta est ad informandum intellectum in ordine ad condendam philosophiam. Atque hæ duæ historiæ tum aliis rebus, tum præcipue in hoc differunt; quod prima ex illis specierum naturalium varietatem, non artium mechanicarum experimenta, contineat." Bacon, observes Napier, has not accused Aristotle of having always reasoned without any reference to facts; but he contends that Aristotle has nowhere stated the rules for aiding and regulating the understanding in the process of discovery by means of facts.

## NOTE 25.

Compare Book IV. De Augmentis: "Sunt enim scientiæ instar pyramidum, quibus historia et experientia, tanquam basis unica, substernuntur; ac proinde basis naturalis philosophiæ est historia naturalis: tabulatum primum a basi est physica, vertici proximum metaphysica," etc.

## NOTE 26.

If a conjecture might be hazarded, "materia;" depending on "passionibus," would seem a more natural reading. All the editions I have consulted, however, exhibit "materia."

## NOTE 27.

Aphor. XCIX.: "Tum vero de scientiarum ulteriore progressu spes bene fundabitur, cum in historiam naturalem recipientur et aggregabuntur complura experimenta, quæ in se nullius sunt usûs, sed ad inventionem causarum et axiomatum tantum faciunt; quæ nos *lucifera* experimenta, ad differentiam *fructiferorum*, appellare consuevimus. Illa autem miram habent in se virtutem et conditionem; hanc videlicet, quod nunquam fallant, aut frustrentur. Cum enim ad hoc adhibeantur, non ut opus aliquod efficiant, sed ut causam naturalem in aliquo revelent, quaquaversum cadunt, intentioni æque satisfaciunt, cum quæstionem terminent."

## NOTE 28.

Aphor. XCII.: "Longe potentissimum futurum est remedium ad spem imprimendam, quando homines ad particularia, præsertim in tabulis nostris inveniendi digesta et disposita (quæ partim ad secundam, sed multo magis ad quartam *Instaurationis* nostræ pertinent) adducemus," etc.

## NOTE 29.

Aphor. IX.: "Causa vero et radix fere omnium malorum in scientiis ea una est; quod dum mentis humanæ vires falso miramur et extollimus, vera ejus auxilia non quæramus." Also Aphor. XXXVII.: "Ratio eorum qui *acatalepsiam* tenuerunt et via nostra, initiis suis quodammodo consentiunt; exitu immensum disjunguntur et opponuntur. Illi enim nihil sciri posse simpliciter asserunt; nos non multum sciri posse in naturâ, eâ, quæ nunc in usu est, viâ: verum illi exinde auctoritatem sensûs et intellectûs destruunt; nos auxilia iisdem excogitamus et subministramus." Also CXXVI.: "Occurret et illud; nos propter inhibitionem quandam pronunciandi, et principia certe ponendi, donec per medios gradus ad generalissima rite perventum sit, suspensionem quandam judicii tueri atque ad *acatalepsiam* rem deducere. Nos vero non *acatalepsiam*, sed *eucatalepsiam*, meditamur et proponimus; sensui enim non derogamus, sed ministramus, et

intellectum non contemnimus, sed regimus. Atque melius est scire quantum opus sit, et tamen nos non penitus scire putare, quam penitus scire nos putare, et tamen nil eorum, quæ opus est, scire."

## NOTE 30.

"In calling man the interpreter of nature, Bacon had plainly the same idea of the object of Physics which I attempted to convey, when I said, that what are commonly called the causes of phenomena are only their established antecedents or signs."—*Stewart*. This analogy has been enlarged upon by Bishop Berkeley: "There is a certain analogy, constancy, and uniformity in the phenomena or appearances of nature, which are a foundation for general rules; and these are a grammar for the understanding of nature, or that series of effects in the visible world whereby we are enabled to foresee what will come to pass in the natural course of things." The grand error of the ancients in physical science, according to *Stewart*, was, that, understanding by causes such antecedents as were necessarily connected with the effects, and from a knowledge of which the effects might be foreseen and demonstrated, and confounding the proper objects of Physics and Metaphysics, they neglected the observation of facts exposed to the examination of their senses, and vainly attempted, by synthetical reasoning, to deduce, as necessary consequences from their supposed causes, the phenomena and laws of nature. "Causa ea est," says Cicero, "quæ id efficit cujus est causa. Non sic causa intelligi debet, ut quod cuique antecedit, id ei causa sit; sed quod cuique efficienter antecedit.—Itaque dicebat Carneades ne Appollinem quidem posse dicere utura, nisi ea, quorum causas natura ita contineret, ut ea fieri necesse esset. Causis enim efficientibus quamque rem cognitis, posse denique sciri quid futurum esset." The student will remember that the word *cause* is used in two senses. A *metaphysical* or *efficient* cause denotes something which is supposed to be necessarily connected with the effect, and without which it could not have happened. In Natural Philosophy, when we speak of one thing being the cause of another, all that we mean is, that the two are constantly con-

joined; so that when we see the one we may expect the other. These conjunctions we learn from experience alone. The latter causes are called *physical*. (But see Mr. Mill, book iii. chap. 5).

## NOTE 31.

“The distinction that is intended to be marked is between things, facts, effects, and the inferences which the mind draws from them.” This is the first aphorism, only that *operâ* is substituted for *re*. Mr. Glassford’s version is, “may have observed by sense or mentally.” Mr. Wood translates, “Man, as the minister and interpreter of nature, does and understands as much as his observations on the order of nature, *either with regard to things or the mind*, permit him.” If not positively wrong, this is certainly at least obscure, and liable to be entirely misunderstood by an English reader. “Observations on the order of nature *with regard to the mind*,” is no part of Bacon’s idea. What he speaks of is, distinctly, “observation by the mind.”—*Craik*.

## NOTE 32.

“The power of man over nature,” says Sir J. Herschel, “is limited only by the one condition, that it must be exercised in conformity with the laws of nature.”

Compare Aphor. iii.: “Quod in contemplatione instar causæ est, id in operatione instar regulæ est.”

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## NOTES ON THE FIFTH BOOK DE AUGMENTIS SCIENTIARUM.

## NOTE 1.

Bacon’s general classification of the objects of human knowledge is as follows. Having stated that memory, reason (strictly so called), and imagination, are the three modes in which the mind operates on the subjects of its thoughts, he adds, these three faculties suggest a corresponding division of human knowledge into three different branches: 1. History, which derives

its materials from Memory; 2. Philosophy, which is the product of Reason; and 3. Poetry (comprehending under this term all the Fine Arts), which is the offspring of the Imagination. This arrangement, with some slight modifications, has been adopted and rendered more complete by D'Alembert. (See Dug. Stewart's Dissertations.)

Brown makes a fourfold division of the Philosophy of the Mind: 1st. Mental Physiology; 2nd. The doctrines of general Ethics; 3rd. Political doctrines; 4th. The doctrines of Natural Theology. The two latter branches, however, he conceives, are reducible to the second, and thus he differs from Bacon, in making Political Science a subdivision of general practical Ethics; and its necessity, as such, he shews well by the consideration that even benevolence, when unaccompanied with wisdom, may be as mischievous and destructive as intentional tyranny. (See Lecture i.). Stewart remarks (in his Philosophy of the Active and Moral Powers of Man): "The great extent and difficulty of those inquiries which have for their object to ascertain what constitutes the happiness of a community, and by what means it may be most effectually promoted, make it necessary to separate them from the other questions of Ethics, and to form them into a distinct branch of the science. It is not, however, in this respect alone that Politics is connected with the other branches of Moral Philosophy. The provision which nature has made for the intellectual and moral progress of the species, all suppose the existence of the political union; and the particular form which this union happens, in the case of any country, to assume, determines many of the most important circumstances in the character of the people, and many of those opinions and habits which affect the happiness of private life. These observations, which represent Politics as a branch of Moral Philosophy, have been sanctioned by the opinions of all those authors, both in ancient and modern times, by whom either the one or the other has been cultivated with much success." Among the former he instances Plato and Aristotle, and even Socrates (though his studies seem to have been chiefly directed to inculcate the duties

of private life). The intimate relations between the two sciences may be distinctly traced also in the speculations of Grotius, of Locke, Fenelon, Montesquieu, Turgot, Smith, and the French Economists. Aristotle informs us very early in the Nicomachian treatise, that he looks upon Politics as the ἀρχιτεκτονική ἐπιστήμη, and Ethics as an introduction to it. The two, therefore, are not identified in his mind as they were in Plato's. In *De Fin.* iv. the Peripatetics and Academics are commended for paying attention to this science, which seems in a great measure overlooked by the other schools of philosophers.

## NOTE 2.

“Doctrina de homine duplex est; aut enim contemplatur hominem segregatum, aut congregatum atque in societate. Alteram harum philosophiam humanitatis; alteram civilem vocamus.”—*De Augm.* lib. iv. The doctrine “de homine congregato” has been recently erected into a distinct body of science, under the name of “Sociology” by M. Comte, who makes it the sixth and last of the fundamental sciences comprised in his “Classification Hierarchique.” For an exposition of its objects and method, see Mill's *Logic*, book vi.

## NOTE 3.

Archbishop Whately remarks (*Rhetoric*, page 199): “This address to the feelings, or active principles of our nature, is usually stigmatized as ‘an appeal to the passions instead of the reason,’ as if reason alone could ever influence the will, and operate as a motive; which it no more can than the eyes, which shew a man his road, can enable him to move from place to place; or than a ship provided with a compass can sail without a wind.” For some admirable remarks on the subject of Imagination, see Whately's *Rhetoric*, p. ii. c. 2, § 2. The word “Phantasia” I have rendered by “Imagination” (the term used in “*The Advancement*”). For a statement of its important functions see Brown's *Philosophy of the Mind*, Lectures xlii., xliii. Dug. Stewart makes it a complex power, including conception or simple apprehension, judgment or taste, and fancy. He goes on to observe:

“The faculty of imagination is the great spring of human activity, and the principal source of human improvement. As it delights in presenting to the mind scenes and characters more perfect than those which we are acquainted with, it prevents us from ever being completely satisfied with our present condition or with our past attainments, and engages us continually in the pursuit of some untried enjoyment, or of some ideal excellence. Hence the ardour of the selfish to better their fortunes, and to add to their personal accomplishments; and hence the zeal of the patriot and philosopher to advance the virtue and happiness of the human race. Destroy this faculty, and the condition of man will become as stationary as that of the brutes.” Jul. C. Hare well remarks: “While the *imagination*, at least the passive and receptive, is an invaluable auxiliary in the philosophic mind,—witness Plato, Augustin, Bacon, Leibnitz, Berkeley, Schelling,—the *fancy* is apt to delude all who play with it, as happens at times, even to Bacon.”—(*Mission of the Comforter*, Note G.) See also Tucker’s *Light of Nature*: “Imagination and Understanding.”

## NOTE 4.

Compare the expression “*opinio humida*” in the *Cogitata et Visa*. The allusion is to the maxim of Heraclitus the Obscure: “Dry light is the best.” By dry light Bacon understood the light of intellect unobscured by the mists of passion, prejudice, or interest.

## NOTE 5.

“Logic alone can never shew that the fact A proves the fact B; but it can point out to what condition all facts must conform, in order that they may prove other facts. To decide whether any given fact fulfils these conditions, or whether facts can be found which fulfil them in any given case, belongs exclusively to the particular art or science, or to our knowledge of the particular subject. It is in this sense that logic is, what Bacon so expressly calls it, *ars artium*, the science of science itself. All science consists of data, and conclusions from those data; of proofs, and what they prove. Now logic points out what relations must

subsist between data and whatever can be concluded from them, between proof and every thing which it can prove.”—*Mill*.

“The laws of inquiry,” says Brown, “those general principles of the logic of physics, which regulate our search of truth in all things, external and internal, do not vary with the name of a science or its objects or instruments. They are not laws of one science, but of every science, whether the objects of it be mental or material, clear or obscure, definite or indefinite; and they are thus universal, because, in truth, though applicable to many sciences, they are only laws of the one inquiring mind, founded on the weakness of its powers of discernment in relation to the complicated phenomena on which those powers are exercised.” In *De Augm. lib. ii.*, Bacon calls Logic and Rhetoric the *artes artium*.

## NOTE 6.

Brown considers the two latter parts of this division the most advantageous to the philosophical inquirer: “The art of reasoning which a judicious logic affords is not so much the art of *acquiring* knowledge, as the art of *communicating* it to others, or *recording* it in the manner that may be most profitable for our own future advancement.”—Lecture xlix.

## NOTE 7.

The meaning of the term “*Experientia Literata*,” which has been very generally misconceived, or indistinctly apprehended, is fixed by Aphor. ci.: “*Postquam vero copia et materies historiae naturalis et experientiae talis, qualis ad opus intellectus sive ad opus philosophicum requiritur, praesto jam sit et parata; tamen nullo modo sufficit intellectus ut in illam materiam agat sponte et memoriter; non magis quam si quis computationem alicujus ephemeridis memoriter se tenere, et superare posse speret. Atque hactenus tamen potiores meditationis partes, quam scriptio inveniendi fuerunt; neque adhuc experientia literata facta est: atqui nulla nisi de scripto inventio probanda est. Illa vero in usum veniente, ab experientia, facta demum literata, melius sperandum.*” It is plain from this Aphorism (and indeed from the word “*Literata*” itself), that the primary reference of the phrase is simply to



the systematic use of writing for the purpose of recording the results of experiment. In the next Aphorism Bacon points out the necessity of disposing in orderly tables such recorded results, with the view of eliciting from an inspection of them the law of which we are in pursuit. Accordingly I had at first thought of translating the phrase "Tabulated Experience;" but the rendering I have adopted is perhaps, on the whole, preferable.

## NOTE 8.

Cf. Cicero de Nat. D. i. 15. "At Persæus Zenonis auditor, eos dicit esse habitos Deos, à quibus magna utilitas ad vitæ cultum esset inventa: ipsasque res utiles et salutare Deorum esse vocabulis nuncupatas," etc. "Videtur inventorum nobilem introductio inter actiones humanas longe primas partes tenere; id quod antiqua secula judicaverunt. Ea enim inventoribus divinos honores tribuerunt: iis autem qui in rebus civilibus merebantur (quales erant urbium et imperiorum conditores, legislatores, patriarum a diuturnis malis liberatores, etc.) heroum tantum honores decreverunt. Atque certe si quis ea recte conferat, justum hoc prisca seculi iudicium reperiet. Etenim inventorum beneficia ad universum genus humanum pertinere possunt; civilia ad certas tantummodo hominum sedes: hæc etiam non ultra paucas aetates durant; illa quasi perpetuis temporibus."—Aphor. cxxix.

## NOTE 9.

Cicero assigns a different reason for the deification of the ibis. —*De Nat. D.* lib. i. 36.

## NOTE 10.

That is, perfecting the *natural process*.

## NOTE 11.

"The main use of syllogisms," according to Locke, "is in the schools, where men were allowed, without shame, to deny the agreement of ideas that do manifestly agree; or out of the schools, to those who from thence have learned, without shame, to deny the connexion of ideas, which even to themselves is visible." An untenable statement, as is shewn by Archbishop Whately.—(Analytical Outline).

“Hæc autem sive inveniendi sive probandi forma in scientiis,” etc. The student will remember Locke’s suggestions for erecting morality into a demonstrative (i. e. a deductive) science. See Essay, book iv. cap. 3, 18.

## NOTE 12.

Abstraction, in Bacon’s use of the term, means the formation of general conceptions from an observation of the phenomena of nature, e. g. from a review of the phenomena of the animal and vegetable world, forming a general conception of life. See for some useful remarks on this subject, Mill’s Logic, book iv. cap. 2.

## NOTE 13.

Cicero thus traces the progress, and states the method of the Academic school: “Hæc in philosophiâ ratio contra omnia disse-  
rendi, nullamque rem aperte judicandi, profecta a Socrate, re-  
petita ab Arcesila, confirmata a Carneade. . . . . Nec tamen  
feri potest, ut, qui hæc ratione philosophentur, ii nihil habeant,  
quod sequantur . . . . . Non enim sumus ii, quibus nihil verum  
esse videatur; sed ii, qui omnibus veris falsa quædam adjuncta  
esse dicamus, tantâ similitudine, ut in iis nulla insit certa judi-  
candi, et assentiendi nota.”—See *De Nat.* book i. chap. 5. “Ci-  
cero,” Dugald Stewart remarks, “who himself belonged nomi-  
nally to the same school, seems to have thought that the contro-  
versial habits imposed on the academical sect by their profession  
of universal doubt, required a greater versatility of talent, and  
fertility of invention, than were necessary for defending any par-  
ticular system of tenets.” (“Nam si singulas disciplinas percipere  
magnum est, quanto majus omnes? quod facere iis necesse est,  
quibus propositum est, veri reperiendi causâ, et contra omnes  
philosophos et pro omnibus dicere.”) Mr. Stewart goes on to  
observe, that “it is not improbable that Mr. Hume, in the pride  
of youthful genius, was misled by this specious, but very falla-  
cious, idea. On the other hand, Bayle has the candour to ac-  
knowledge, that nothing is so easy as to dispute after the man-  
ner of the sceptics; and to this proposition every man of reflec-  
tion will find himself more and more disposed to assent as he

advances in life. It is experience, alone, that can convince us how much more difficult it is to make any real progress in the search after truth, than to acquire a talent for plausible speculation."—See Cicero's justification of the Academics, *Off.* lib. ii. 2. Bacon quotes the following argument of Cicero on this subject: "So Cicero went about to prove the sect of Academics, which suspended all asseveration, for to be the best. For, saith he, ask a Stoic which philosophy is true, he will prefer his own. Then ask him which approacheth next to the truth, he will confess the Academics. So deal with the Epicure, that will scarce endure the Stoic to be in sight of him; so soon as he hath placed himself, he will place the Academics next him. So, if a prince took diverse competitors to a place and examined them severally, whom next themselves they would rarest commend, it were like the ablest man should have the most second voices."—*Colours of Good and Evil*. Bacon seems to count but two ages of the Academy, and obviously distinguishes the Academics from the Sceptics. ("In utrâque Academiâ (veteri et novâ) multo magis inter Scepticos.") Compare Aphor. LXVII. (quoted in first note, Pref. to Nov. Org.)

Ritter makes the following distinction between the Sceptics and the members of the new Academy, at its first formation by Arcesilas. "Whereas the former made the end of life to be the attainment of a perfect equanimity, and derived the difference between good and bad, as presented by the phenomena of life, from convention, and not from nature, the Academicians, on the contrary, refused to burst so violently all the bonds of life; they did not altogether submit to a course of conduct which, however unphilosophical, necessity enforced upon them, and which, in the moderation of the passions at most, allowed some vestiges of the reason to be traced; but they admitted that the sage, without absolutely mortifying his sensual desires, will live like any other in obedience to the general estimate of good and evil, but with this simple difference, that he does not believe that he is regulating his life by any certain and stable principles of science.

"The distinction, which, on the authority of Sext. Emp. Hyp.

Pyrrh. i. 3, 226, 233, Gell. xi. 5 ('Academici quidem ipsum illud, nihil posse decerni, quasi decernunt; Pyrrhonii ne id quidem ullo pacto videri verum dicunt, quod nihil esse verum videntur'), is made to consist in this, that while the Academy maintained that man cannot know anything, the Sceptics did not,—certainly had no foundation in fact, at least in this form, as may be seen from Cic. Ac. i. 12." (The passage alluded to by Ritter is as follows: "Arcesilas negabat esse quidquam, quod sciri posset, ne illud quidem ipsum, quod Socrates sibi reliquisset (i. e., se nihil scire, id unum scire)," &c.)

There is an accurate statement of the doctrine of Carneades given Acad. lib. i. 31.

## NOTE 14.

Stewart also illustrates the advantage of aids to our intellectual faculties, by the use of tools and instruments in mechanical labours; and as instances of such aids he cites the wonderful effects of algebra in facilitating the inquiries of modern mathematicians, and the use of general and technical terms. As historical proofs of the same, he notices the effects of Lord Bacon's writings on the progress of physics, and the analysis of the Greek geometers.

## NOTE 15.

Nov. Org. lib. ii. Aphor. x.: "Indicia *de Interpretatione Naturæ* complectuntur partes in genere duas; primam de educendis aut excitandis axiomatibus ab experientiâ; secundam de deducendis aut derivandis experimentis novis ab axiomatibus. Prior autem trifariam dividitur; in tres nempe ministraciones; ministratiōnem ad sensum, ministratiōnem ad memoriā; et ministratiōnem ad mentem sive rationem. Primo enim paranda est *historia naturalis et experimentalis*, sufficiens et bona; quod fundamentum rei est. . . . . Secundo formandæ sunt *tabulæ*, et *coordinatiōnes instantiarum*, tali modo et instructione, ut in eas agere possit intellectus. . . . . Tertio, adhibenda est *inductio* legitima et vera, quæ ipsa *clavis est interpretatiōnis*."

## NOTE 16.

The following passage, taken from the *De Augmentis*, lib. ii.,

explains the meaning of this expression: "But, forasmuch as it was Pan's good fortune to find out Ceres as he was hunting, and thought little of it, which none of the other gods could do, though they did nothing else but seek her, and that very seriously, it gives us this true and grave admonition: that we expect not to receive things necessary for life and manners from philosophical abstractions, as from the greater gods, albeit they applied themselves to no other study, but from Pan, that is, from the discreet observation and experience, and the universal knowledge of the things of this world; for Pan (as his name imports) represents, and lays open the *All* of things or nature, whereby (oftentimes even by chance, and, as it were, going a hunting) such inventions are lighted upon; for it is to experience we are indebted for all the most useful inventions, which are like largesses thrown by chance amongst men."

*abstract Philon  
Sophies.*

## NOTE 17.

Compare Aphor. LXXXII.: "Restat experientia mera, quæ, si occurrat, casus; si quæsita sit, experimentum nominetur. Hoc autem experientiæ genus nihil aliud est quam (quod aiunt) scopæ dissolutæ, et mera palpatio, quali homines noctu utuntur, omnia pertentando, si forte in rectam viam incidere detur; quibus multo satius et consultius foret diem præstolari, aut lumen accendere et deinde viam inire. At contra, verus experientiæ ordo primo lumen accendit, deinde per lumen iter demonstrat, incipiendo ab experientiâ ordinatâ et digestâ, et minime præposterâ aut erraticâ, atque ex eâ educendo axiomata atque ex axiomatibus constitutis rursus experimenta nova, cum nec verbum divinum in rerum massam absque ordine operatum sit."

## NOTE 18.

It will be seen that I have translated only such parts of Bacon's account of the "Experientia Literata," as would serve to convey a general idea of each of the processes specified. The Latin I have given entire.

## NOTE 19.

"Of the double significations so common in Bacon's phraseo-

logy, a remarkable instance occurs in the use which he makes of the scholastic word *forms*. In one passage he approves of the opinion of Plato, that the investigation of forms is the proper object of science; adding, however, that this is not true of the forms which Plato had in view, but of a different sort of forms, more suited to the grasp of our faculties. In another passage he observes, that when he employs the word *forms*, in speaking of natural philosophy, he is always to be understood as meaning the laws of nature." ("Nos enim, cum de formis loquimur, nil aliud intelligimus, quam leges illas, quæ naturam aliquam simplicem ordinant et constituunt; ut calorem, lumen, pondus, in omnimodâ materiâ et subjecto susceptibili. Itaque eadem res est *forma calidi*, aut *forma luminis*, et *lex calidi* sive *lex luminis*."—*Nov. Org.* lib. ii. Aphor. xvii.) Mr. Mill thinks that Bacon meant by Form an invariable coexistent of any property of an object; and remarks, that the examples chiefly selected by him for the application and illustration of his method were inquiries into such forms, attempts to determine in what else all those objects resembled, which agreed in some one general property, as hardness or softness, dryness or moistness, heat or coldness. Such inquiries, however, could lead to no result. The objects seldom have any such circumstance in common. They usually agree in the one point inquired into, and in nothing else.—Vol. ii. page 127. "The investigation of what he calls *forms*," says Mr. Craik, "may be said to be the grand object of Bacon's philosophy. Yet it may be questioned if he attached any clear or consistent idea to the term. He informs us, indeed, in some of his Aphorisms, and more expressly in the seventeenth of the second book of the *Novum Organum*, that a form is the same with a law; and hence it has been commonly said, that whenever Bacon speaks of a form in physics, we are to understand him as meaning simply what is now commonly called a law of nature. But the fact is, that a law of nature with him is quite a different thing from what is now so called. This is evident from his explanation of what he means by a law or form, and still more from his examples. We have found him, for instance, in the fourth book of

the *De Augmentis*, asserting, that no inquisition had been made into the form of light, in the same paragraph in which he complains that the attention of inquirers had been solely directed to what he calls perspective and radiations, and that the treatment of the whole had been vitiated by the application of mathematics. The fact that the angle of reflection is equal to the angle of incidence would not have been accepted by Bacon as a law of light. A law of nature in modern physics is merely a statement of the manner in which nature has been uniformly found to act in certain given circumstances; hence it implies always movement or process. It is a statement of some *operation* of nature. Modern physics know nothing of any law of light or heat, or anything else, in a state of rest or inaction. Bacon's use of the term has no such limitation. With him every natural substance, every nature, as he terms it, has its law, absolutely, and under all circumstances; which, he tells us, as we have seen, is the same thing with that which distinguishes it from every other nature, or with its *natura naturans*, or the nature that produces it, and makes it what it is, or with what he calls the fountain from which it emanates, meaning, evidently, some principle in the constitution of things to which the substance owes its existence. Anything more entirely distinct, more widely different, from what is now understood by a law of nature, cannot be imagined." Compare also *Nov. Org. lib. ii. Aphor. i.*: "*Data autem naturæ formam, sive differentiam veram, sive naturam naturantem, sive fontem emanationis (ista enim vocabula habemus quæ ad indicationem rei proxime accedunt) invenire, opus est et intentio humanæ scientiæ.*"

## NOTE 20.

Dr. Reid reprobates, altogether, the use of hypotheses in our investigations, on the ground that the causes assigned for any phenomenon should, at least, comply with the conditions laid down in Newton's primary rule of philosophising: "*ut et veræ sint, et phenomenis explicandis sufficient.*" But Reid, when reprobating hypotheses, uniformly takes for granted that they are wholly gratuitous and arbitrary. The real philosophical import

of Newton's maxim is well explained by Mr. Mill to be, that the cause suggested by the hypothesis should be, in its nature, susceptible of being proved by other evidence: "What he meant by a *vera causa*, Newton did not, indeed, very explicitly define, and Mr. Whewell, who dissents from the propriety of any such restriction upon the latitude of framing hypotheses, has had little difficulty in shewing that his conception of it was neither precise nor consistent with itself; accordingly, his optical theory was a signal instance of the violation of his own rule, and Mr. Whewell is clearly right in denying it to be necessary that the cause assigned should be a cause already known, else how could we ever become acquainted with any new cause? But what is true in the maxim is, that the cause, although not known previously, should be capable of being known thereafter," &c. Thus a genuinely scientific hypothesis cannot always remain an hypothesis, but is certain to be either proved or disproved by that comparison with observed facts which is termed Verification. (It will be found useful to read over this whole chapter of Mill, book iii. chap. 14.)

## NOTE 21.

Dr. Reid challenges the votaries of hypotheses to shew one useful discovery, in the works of nature, that was ever made in that way. Stewart, in reply, adduces the theory of Gravitation, and the Copernican system. Locke admits that we may, to explain any phenomena of nature, make use of any probable hypothesis whatever. "Hypotheses," he says, "if they are well made, are, at least, great helps to the memory, and often direct us to new discoveries." He cautions us not to take up any one too hastily (which the mind, that would always penetrate into the causes of things, and have principles to rest on, is very apt to do) till we have very well examined particulars, and made several experiments in that thing which we would explain by one hypothesis, and see whether it will agree to them all. See book iv. chap. 12.

Hypotheses, as *suggesting* observations and experiments, are absolutely indispensable to science. "An hypothesis," says Brown,



“is nothing more than a reason for making one experiment or observation rather than another; and it is evident that, without some reason of this kind, as experiments are almost infinite, inquiry would be altogether profitless.”

## NOTE 22.

Stewart remarks that the utility of hypothetical theories is not confined to those cases in which they have been confirmed by subsequent researches; that it may be equally great, where they have completely disappointed the expectations of their authors. He fully concurs in Hartley's remark, that “any hypothesis which possesses a sufficient degree of plausibility to account for a number of facts, helps us to digest these facts in proper order, to bring new ones to light, and to make *experimenta crucis* for the sake of future inquirers.” Stewart thinks that it is in this way that most discoveries have been made; for although a knowledge of facts must be prior to the formation of a legitimate theory, yet an hypothetical theory is generally the best guide to the knowledge of connected and useful facts. And even when the hypothesis has been abandoned as an unfounded conjecture, an approach is made to the truth in the way of exclusion; while, at the same time, an accession is gained to that class of associated and kindred phenomena which the inquirer wishes to trace to their parent stock.—See, for some pertinent remarks, Mill, book iii. chap. 20.

## NOTE 23.

He dwells on this subject at considerable length in the eighth book, chap. III.: “Cicero præcipit, ut in promptu habeantur loci communes in utramque partem disputati et tractati. Quales sunt, ‘Pro verbis legis,’ et ‘pro sententiâ legis,’ etc. Nos vero præceptum etiam ad alia extendimus; ut non solum ad genus judiciale, sed etiam ad deliberativum et demonstrativum adhibeatur. Omnino hoc volumus, locos omnes, quorum frequens est usus (sive ad probationes et refutationes, sive ad suasiones et dissuasiones, sive ad laudes et vituperia spectent) meditados jam haberi, eosque ultimis ingenii viribus,

et tanquam improbe, et prorsus præter veritatem, attolli et deprimi. Modum autem hujus collectionis, tam ad usum, quam ad brevitatem, optimum fore censemus, si hujusmodi loci contrahantur in sententias quasdam acutas et concisas; tanquam glomos quosdam, quorum fila in fusiorem discursum, cum res postulat, explicari possint. Atque similem quandam diligentiam in Senecâ reperimus, sed in hypothesibus sive casibus. Ea autem Antitheta Rerum nominamus." He then gives several examples. See on this same subject Archbishop Whately's Rhetoric, part i. chap. 3.

## NOTE 24.

"Some of the followers of Lord Bacon have, I think, been led, in their zeal for the method of induction, to censure hypothetical theories with too great a degree of severity. Such theories have certainly been frequently of use, in putting philosophers upon the road of discovery. Indeed, it has probably been in this way that most discoveries have been made; for, although a knowledge of facts must be prior to the formation of a just theory, yet an hypothetical theory is generally our best guide to the knowledge of useful facts. If a man, without forming to himself any conjecture concerning the unknown laws of nature, were to set himself merely to accumulate facts at random, he might, perhaps, stumble upon some important discovery; but by far the greater part of his labours would be wholly useless. Every philosophical inquirer, before he begins a set of experiments, has some general principle in his view, which he suspects to be a law of nature; and although his conjectures may be often wrong, yet they serve to give his inquiries a particular direction, and to bring under his eye a number of facts which have a certain relation to each other. It has been often remarked, that the attempts to discover the philosopher's stone, and the quadrature of the circle, have led to many useful discoveries in chemistry and mathematics. And they have plainly done so merely by limiting the field of observation and inquiry, and checking that indiscriminate and desultory attention which is so natural to an indolent mind. An hypothetical theory,

however erroneous, may answer a similar purpose. "Prudens interrogatio," says Lord Bacon, "est dimidium scientiæ. Vaga enim experientia et se tantum sequens mera palpatio est, et homines potius stupefacit quam informat." What, indeed, are Newton's queries but so many hypotheses which are proposed as subjects of examination to philosophers? And did not even the great doctrine of gravitation take its first rise from a fortunate conjecture?"—*Stewart, Phil. of the Mind.*

Mr. Coleridge remarks that Bacon demands, in all philosophic experiment, as its motive and guide, what may be called the intellectual or mental initiative, some well-grounded purpose, some distinct impression of the probable results, some self-consistent anticipation, as the ground of the *prudens quæstio*, the *forethoughtful query*, which he affirms to be the prior half of the knowledge sought, *dimidium scientiæ*.

## NOTE 25.

"By the extension of human knowledge," says Dug. Stewart, "the scale upon which the analogies of nature may be studied is so augmented as to strike the most heedless eye; while, by its diffusion, the perception of these analogies (so essential an element in the composition of inventive genius) is insensibly communicated to all who enjoy the advantages of a liberal education. Justly, therefore, might Bacon say, 'Certo sciant homines, artes inveniendi solidas et veras adolescere, etc.'"

## NOTE 26.

It has not been thought necessary to translate this Example of Topic Particular.

## NOTE 27.

Example differs from Induction only in having a singular instead of a general conclusion; and that from a single case.—See Whately's Logic, book iv. chap. 1, sec. 2.

## NOTE 28.

For an accurate statement of the theory of the syllogism, and an ample refutation of various prevalent misconceptions respect-

ing it, Whately's Logic, Analytical Outline, and book iii. Introd. and sec. 2, should be consulted.

## NOTE 29.

Compare Locke's Analysis of Reason (which, it may be observed, he constantly confounds with Reasoning), as containing two of our intellectual faculties, Sagacity and Illation. "By the one it finds out, and by the other it so orders the intermediate ideas, as to discover what connexion there is in each link of the chain whereby the extremes are held together," &c. The latter seems its more appropriate office. "The business of Logic is, as Cicero complains, to *judge* of arguments, not to *invent* them ('in inveniendis argumentis muta nimium est: in judicandis nimium loquax.')

The knowledge, again, in each case, of the subject in hand, is essential; but it is evidently borrowed from the science or system conversant about that subject-matter, whether Politics, Law, Ethics, or any other."—*Whately's Rhetoric*.

## NOTE 30.

"It is a maxim of the schoolmen, that 'Contrariorum eadem est scientia:?' we never really know what a thing is, unless we are also able to give a sufficient account of its opposite. Conformably to this maxim, one considerable section, in most treatises on Logic, is devoted to the subject of Fallacies. The philosophy of reasoning, to be complete, ought to comprise the theory of bad as well as of good reasoning."—*Mill's Logic*, book v. chap. 1; where may be found an admirable classification of Fallacies. The student will, of course, make himself familiar with Archbishop Whately's book on the same subject.

## NOTE 31.

"The book  $\Pi\epsilon\rho\iota$  'Ερμηνείας is absurdly translated *De Interpretatione*. It should be styled in Latin *De Enunciandi Ratione*. In English we might render it, *On the doctrine of Enouncement, Enunciation, or the like*."—*Sir W. Hamilton* (*Editor of Reid's Works*). "In the treatise  $\Pi\epsilon\rho\iota$  'Ερμηνείας, Aristotle develops the nature and limitations of propositions, the meaning of con-

traries and contradictories, the force of affirmations and denials, in impossible, contingent, and necessary matter.”—*Encycl. Metrop.*

## NOTE 32.

A passage in the third book De Augmentis will explain the meaning of the term *Philosophia Prima*: “Quoniam autem partitiones scientiarum non sunt lineis diversis similes, quæ coeunt ad unum angulum; sed potius ramis arborum, qui conjunguntur in uno trunco;—idcirco postulat res, ut priusquam prioris partitionis membra persequamur, constituatur una scientia universalis, quæ sit mater reliquarum, et habeatur in progressu doctrinarum, tanquam portio viæ communis, antequam viæ se separent et disjungant. Hanc scientiam, *philosophiæ primæ* nomine insignimus, . . . . . id tantum volumus, ut designetur aliqua scientia, quæ sit receptaculum axiomatum quæ particularium scientiarum non propria, sed pluribus earum in commune competant. . . . . Est et alia hujus philosophiæ primæ pars. . . . . Est autem inquisitio de conditionibus adventitiis entium (quas transcendentis dicere possumus) pauco, multo;” etc. In De Augm. lib. i. he illustrates, by a happy allusion, the pre-eminence of this *Philosophia Prima* among the other sciences. “Alius error est, quod post singulas scientias et artes suas in classes distributas, mox a plerisque universali rerum cognitioni et *philosophiæ primæ* renunciat; quod quidem profectui doctrinarum inimicissimum est. Prospectationes fiunt a turribus aut locis præaltis, et impossibile est, ut quis exploret remotiores interioresque scientiæ alicujus partes, si stet super plano ejusdem scientiæ, neque altioris scientiæ veluti speculum conscendat.” Mr. Macaulay remarks: “In the third book of the De Augmentis, Bacon tells us that there are some principles which are not peculiar to one science, but are common to several. That part of philosophy which concerns itself with these principles is, in his nomenclature, designated as *Philosophia Prima*. He then proceeds to mention some of the principles with which this *Philosophia Prima* is conversant. One of them is this:—An infectious disease is more likely to be communicated while it is

in progress than when it has reached its height. This, says he, is true in medicine. It is also true in morals; for we see that the example of very abandoned men injures public morality less than the example of men in whom vice has not yet extinguished all good qualities." Mr. Macaulay adds, "the similitudes which we have cited are very happy similitudes. But that a man like Bacon should have taken them for more, that he should have thought the discovery of such resemblances as these an important part of philosophy, has always appeared to us one of the most singular facts in the history of letters."

## NOTE 33.

Stewart remarks, that the word Metaphysics was formerly appropriated to the ontology and pneumatology of the schools, but is now understood as equally applicable to all those inquiries which have, for their object, to trace the various principles of human knowledge to their first principles in the constitution of our nature. "There is a certain *Philosophia Prima*, on which all other philosophy ought to depend; and consisteth principally in right limiting of the significations of such appellations or names as are of all others the most universal; which limitations serve to avoid ambiguity and equivocation in reasoning, and are commonly called Definitions; such as are the Definitions of Body, Time, Place, &c. . . . The explication of which, and the like terms, is commonly called in the schools Metaphysics."—(*Hobbes' Moral and Political Works.*) In the third book *De Augmentis* we find the following distinction drawn between the *Philosophia Prima*, *Metaphysics*, and *Physics*. "Patet disjungere nos philosophiam primam a metaphysicâ, quæ hactenus pro re eâdem habitæ sunt. Illam communem scientiarum parentem, hanc naturalis philosophiæ portionem, posuimus. Atque philosophiæ primæ communia et promiscua scientiarum axiomata assignavimus. . . . Inquisitionem causarum in theoreticam coniecimus. Eam in physicam et metaphysicam partiti sumus . . . . physica est, quæ inquit de efficiente et materiâ; metaphysica, quæ de formâ et fine." (The probable origin of

the name *Metaphysics* may be found, in its application, as a running title of several essays of Aristotle, which were placed in a collection of his manuscripts, *after his treatise on Physics.*)

## NOTE 34.

“The Categories or Predicaments,—the former a Greek word, the latter, its literal translation in the Latin language,—were intended, by Aristotle and his followers, as an enumeration of all things capable of being named; an enumeration by the *summa genera*, i. e. the most extensive classes into which things could be distributed, which, therefore, were so many highest predicates, one or other of which was supposed capable of being affirmed with truth of every nameable thing whatsoever.”—*Mill*. “They serve the purpose of marking out certain tracks, as it were, which are to be pursued in searching for middle terms in each argument respectively, it being essential that we should generalize on a right principle.”—See *Whately's Logic*, book iv. chap. 2, sec. 1. For some acute criticisms on Aristotle's Categories, see *Mill's System of Logic*, book i. chap. 3.; also *Cousin's* fifth lecture on Kant's Philosophy.

## NOTE 35.

The student will find it advantageous to compare Locke's chapter on the Association of Ideas, which treats nearly of the same prejudices as Bacon's Idola.

## NOTE 36.

“We call them Idols of the Theatre,” says Bacon (Aphor. XLIV.), “because all the systems of philosophy that have hitherto been invented or received are but so many stage-plays, which have exhibited nothing but fictitious and theatrical worlds; and there may still be invented and dressed up numberless other fables of the like kind.” In Aphor. LXIV., he divides these visionary systems of philosophy into *three* general kinds: *sophistical*, *empirical*, and *superstitious*. *Sophistical* philosophies are those formed on careless and hasty observations and experiments, and filled up capriciously by the mind of the inventor. Aristotle's

philosophy is an instance of this class. ("Aristoteles philosophiam naturalem dialecticâ suâ corrumpit; quum mundum ex categoriis effecerit; animæ humanæ, nobilissimæ substantiæ, genus ex vocibus secundæ intentionis tribuerit; . . . . Ille enim prius decreverat; neque experientiam ad constituenda decreta et axiomata rite consuluit; sed postquam pro arbitrio suo decrevisset, experientiam ad sua placita tortam circumducit et captivam; ut hoc etiam nomine magis accusandus sit, quam sectatores ejus moderni (scholasticorum philosophorum genus) qui experientiam omnino deseruerunt.") *Empirical systems* are those formed on *a few experiments only*, though these may be made with great exactness. Bacon instances Gilbert. ("At philosophiæ genus empiricum placita magis deformia et monstrosa educit, quam sophisticum aut rationale genus; quia non in luce notionum vulgarium (quæ, licet tenuis sit et superficialis, tamen est quodammodo universalis, et ad multa pertinens) sed in paucorum experimentorum angustiis et obscuritate fundatum est.") Bacon thinks that there is considerable danger that even his own method, of which experiment makes so important a part, may, in after times, give birth to much erroneous philosophizing of the empiric kind.) *Superstitious systems* are those in which certain philosophical theories are blended with religion, and the one is made subservient to the other; of this the Pythagorean and Platonic systems are instances. ("At corruptio philosophiæ ex superstitione, et theologiâ admistâ latius omnino patet, et plurimum mali infert, aut in philosophias integras, aut in earum partes. Humanus enim intellectus non minus impressionibus phantasiæ est obnoxius, quam impressionibus vulgarium notionum. Pugnax enim genus philosophiæ et sophisticum illaqueat intellectum; at illud alterum phantasticum et tumidum et quasi poeticum magis blanditur intellectui. Inest enim homini quædam intellectûs ambitio, non minor quam voluntatis; præsertim in ingeniis altis et elevatis.")

## NOTE 37.

In Aphorism LII. he thus enumerates the sources of the *Idola Tribûs*. "Ortum habent aut ex æqualitate substantiæ spiritûs



humani; aut ex præoccupatione ejus; aut ab angustiis ejus; aut ab inquieto motu ejus; aut ab infusione affectuum; aut ab incompetentiâ sensuum; aut ab impressionis modo."

## NOTE 38.

In Aphor. XLVI. he remarks: "humano intellectui error est proprius et perpetuus, ut magis moveatur et excitetur affirmativis quam negativis." . . . . "Quin contra, " he adds, " in omni axiomatico vero constituendo, major est vis instantiæ negativæ." Thus recognising (in Mr. Mill's language) the superiority of the method of Difference over that of Agreement. Mr. Mill classes this Idol under the Fallacies of Observation. "It is evident that when the instances on one side of a question are more likely to be remembered and recorded than those on the other, especially if there be any strong motive to preserve the memory of the first, but not of the latter, these last are likely to be overlooked, and escape the observation of the mass of mankind. This is the recognised explanation of the credit given, in spite of reason and evidence, to many classes of impostors; to quack doctors and fortune-tellers in all ages; to the 'cunning man' of modern times, and the oracles of old. Few have considered the extent to which this fallacy operates in practice, even in the teeth of the most palpable negative evidence. A striking example of it is the faith which the uneducated portion of the agricultural classes, in this and other countries, continue to repose in the prophecies, as to weather, supplied by almanac-makers, although every season affords to them numerous cases of completely erroneous prediction; but as every season also furnishes some cases in which the prediction is verified, this is enough to keep up the credit of the prophet with people who do not reflect on the number of instances requisite for what we have called, in our inductive terminology, the Elimination of Chance, since a certain number of casual coincidences not only may, but will happen, between any two unconnected events."

## NOTE 39.

"Under the head of Fallacies of False Analogy," says Mr. Mill,

“we may class the reasonings, so common in the speculations of the ancients, founded upon a supposed *perfection* in nature; meaning by nature the customary order of events, as they take place of themselves, without human interference. This is a rude guess at an analogy supposed to pervade all phenomena, however dissimilar, since what was thought to be perfection appeared to obtain in some phenomena, it was inferred to obtain in all.” “We always suppose that which is better to take place in nature, if it be possible,” says Aristotle; “and the vaguest and most heterogeneous qualities being confounded together under the notion of being *better*, there was no limit to the wildness of the inferences. Thus, because the heavenly bodies were ‘perfect,’ they must move in circles, and uniformly.” A tendency of the mind, similar to that mentioned here by Bacon, is noticed by Brown, that of ascribing to substances without, as if existing in them like permanent physical qualities, the relations which ourselves have formed by the mere comparison of objects with objects, and which, in themselves, as relations, are nothing more than modifications of our own minds.

## NOTE 40.

This assumption had been disproved, a few years before Bacon wrote, by Kepler, who shewed that the planets move in elliptical orbits.

## NOTE 41.

See the Epicurean arguments for the human form of the gods, stated by Velleius, first book of Cicero’s *De Nat. Deorum*, chap. 12, 17, 18, and Cotta’s reply, chap. 30: “Nonne pudet igitur physicum, id est, speculatorem naturæ, ab animis *consuetudine* imbutis, petere testimonium veritatis?” &c. “Let *custom*,” says Locke, “from the very childhood, have joined figure and shape to the idea of God, and what absurdities will that mind be liable to about the Deity.”—Book ii. chap. 33, 17. See also book i. chap. 4, 16.

## NOTE 42.

In the forty-second Aphorism he enumerates four sources of

these *Idola Specûs*. “Natura cujusque propria et singula; educatio et conversatio cum aliis; lectio librorum et auctoritates eorum quos quisque colit et miratur; differentiæ impressionum, prout occurrunt in animo præoccupato et prædisposito, aut in animo æquo et sedato.” The nature of the *Idola Specûs*, into which different individuals are most liable to fall, is chiefly determined by the following cardinal distinction in their intellectual characters: “Maximum et veluti radicale discrimen ingeniorum quoad philosophiam et scientias, illud est; quod alia ingenia sint fortiora et aptiora ad notandas rerum differentias; alia ad notandas rerum similitudines. Ingenia enim constantia et acuta figere contemplationes, et morari, et hærere, in omni subtilitate differentiarum possunt: ingenia autem sublimia et discursiva etiam tenuissimas et catholicas rerum similitudines et agnoscunt et componunt.” (It is very probable that Locke had this remarkable passage in view when drawing the contrast between *wit* and *judgment*; *wit* being connected with what Bacon calls the *discursive genius*.) In a subsequent Aphorism he gives another enumeration of the sources of the *Idola Specûs*: “Aut ex prædominantiâ, aut ex excessu compositionis et divisionis, aut ex studiis erga tempora, aut ex objectis largis et minutis ortum habent;” thus rendered by Mr. Craik: “They arise, for the most part, from certain predominant views, or from an excessive addictedness either to composition or to division (that is, to the synthetic or the analytic mode of viewing things), or from a preference for one age of the world, or period of time, to another, or from the largeness or minuteness of the objects contemplated (that is, as we might express it, in a phraseology that would not have been so intelligible in Bacon’s day, from the telescopic or microscopic character of the mind).”

## NOTE 43.

Sir W. Hamilton (in his edition of Reid’s Works) remarks, that the meaning of Plato’s comparison of the cave has been misconceived by many eminent writers. In the similitude in question (which may be found in the seventh book of the Republic),

Plato is supposed by them to intend an illustration of the mode in which the shadows or vicarious images of external things are admitted into the mind,—to typify, in short, an hypothesis of sensitive perception. On this supposition, the identity of the Platonic, Pythagorean, and Peripatetic theories of this process is inferred. Nothing can, however, be more groundless than the supposition; nothing more erroneous than the inference. By his *cave*, *images*, and *shadows*, Plato meant simply to illustrate the grand principle of his philosophy—that the Sensible or Ectypal world (phænomenal, transitory, *γγινόμενον, ὄν καὶ μὴ ὄν*), stands to the Noetic or Archetypal (substantial, permanent, *ὄντως ὄν*) in the same relation of comparative unreality, in which the *shadows or images* of sensible existences themselves stand to the things of which they are the dim and distant adumbrations. . . . And as the comparison is misunderstood, so nothing can be conceived more adverse to the doctrine of Plato than the theory it is supposed to elucidate. Plotinus, indeed, formally refutes, as contrary to the Platonic, the very hypothesis thus attributed to his master. (See Reid, Essay II. chap. vii.; Stewart on the Powers of external Perception, chap. i. sect. 1.; Locke has made use of a similar comparison, book ii. chap. 11). The same writer remarks: “If Bacon took his simile of the cave from Plato, he has perverted it from its proper meaning; for, in the Platonic signification, the *Idola Specūs* should denote the prejudices of the species, and not of the individual,—that is, express what Bacon denominates by *Idola Tribūs*.”

## NOTE 44.

In the sixtieth Aphorism he divides the *Idola Fori* into two classes: “Aut sunt rerum nomina quæ non sunt, aut sunt nomina rerum quæ sunt, sed confusa et male terminata, et temere et inæqualiter a rebus abstracta.” As instances of the first class he cites the terms “fortuna,” “primum mobile,” etc.; and remarks that this class can be more easily got rid of, “quia per constantem et abnegationem et antiquationem theoriarum exterminari possunt.” As an instance of the second class he adduces the various meanings attached to the word *humidum* or *moisture*, so

familiar in the physics of antiquity, and of the middle ages: "Invenietur verbum istud, Humidum, nihil aliud quam nota confusa diversarum actionum, quæ nullam constantiam aut reductionem patiuntur. Significat enim, et quod circa aliud corpus facile se circumfundit; et quod in se est indeterminabile, nec consistere potest; et quod facile cedit undique, et quod facile se dividit et dispergit; et quod facile se unit et colligit; et quod facile fluit, et in motu ponitur; et quod alteri corpori facile adhæret, idque madefacit; et quod facile reducitur in liquidum, sive colliquatur, cum antea consisteret. Itaque quum ad hujus nominis prædicationem et impositionem ventum sit; si aliâ accipias, flamma humida est; si aliâ accipias, aer humidus non est; si aliâ, pulvis minutus humidus est; si aliâ, vitrum humidum est: ut facile appareat, istam notionem ex aquâ tantum, et communibus et vulgaribus liquoribus, absque ullâ de vitâ verificatione, temere abstractam esse." "Bacon himself," says Mr. Mill, "is not exempt from a similar accusation when inquiring into the nature of heat; where he occasionally proceeds like one who, seeking for the cause of hardness, after examining that quality in iron, flint, and diamond, should expect to find that it is something which can be traced also in hard water, a hard knot, and a hard heart." In the same Aphorism mentioned above, Bacon enumerates *three degrees* of error in words: "Minus vitiosum genus est nominum substantiæ alicujus, præsertim specierum infimarum; . . . vitiosius genus est actionum ut *generare, corrumpere, alterare*: vitiosissimum est qualitatum ut *gravis, levis, tenuis, densi*."

## NOTE 45.

"It is usual for writers on logic, after taking notice of the errors to which we are liable in consequence of the ambiguity of words, to appeal to the example of mathematicians, as a proof of the infinite advantage of using, in our reasonings, such expressions only as have been carefully defined. Various remarks to this purpose occur in the writings of Mr. Locke and Dr. Reid. But the example of mathematicians is by no means applicable to the sciences in which these eminent philosophers propose that it

should be followed; and, indeed, if it were copied as a model in any other branch of human knowledge, it would lead to errors fully as dangerous as any which result from the imperfections of language. The real fact is, that it is copied much more than it ought to have been, or than would have been attempted, if the peculiarities of mathematical evidence had been attentively considered. That in mathematics there is no such thing as an ambiguous word, and that it is to the proper use of definitions we are indebted for this advantage, must unquestionably be granted. But this is an advantage easily secured, in consequence of the very limited vocabulary of mathematicians, and the distinctness of the ideas about which the reasonings are employed." Definitions in mathematics answer two purposes: first, to prevent ambiguities; and secondly, to serve as the principles of our reasonings. It is only in the former use of definitions that any parallel can be drawn between mathematics and those branches of knowledge which relate to facts. (See Stewart's Philosophy.) The student may remember that Locke, when arguing for the demonstrability of morality, dwells on the importance of definitions towards the attainment of that object. But whether these would be of any real service seems questionable; "for," as Bishop Butler remarks, "in morals, ideas are never in themselves determinate, but become so by the train of reasoning and the place they stand in; since it is impossible that words can always stand for the same ideas, even in the same author, much less in different ones." — *Pref. to Sermons.*

## NOTE 46.

"This Aphorism may be considered as the text of by far the most valuable part of Locke's Essay, that which relates to the imperfections and abuse of words; but it was not until within the last twenty years that its depth and importance were perceived in all their extent. I need scarcely say that I allude to the excellent Memoirs of M. Prevost and M. Degerandó, on Signs considered in their Connexion with the Intellectual Operations." — *Stewart's Dissertations.* In Whately's Logic (book

iii. sec. 5) the student will find many striking instances of Fallacies of the Forum. Brown explains in the following manner the influence which Bacon had particularly in view when speaking of the command of words over our thoughts: "The influence of language, as the direct medium of thought, perpetuating, by habitual use, the prejudices involved in the original meaning of certain words, or by accidental association conveying peculiar differences of meaning to the minds of different individuals, and thus strengthening and fixing in each many separate prejudices, in addition to the general prejudices of mankind."

## NOTE 47.

The project for the invention of a more convenient instrument of thought has often been entertained; witness, for instance, the attempts towards framing a philosophical language. Leibnitz, according to Stewart, first conceived the possibility of aiding the powers of invention and reasoning in this way (in his *Ars Combinatoria*, and the *Alphabet of Human Thought*); but he remarks that all such projected aids proceed on the supposition that, in all the sciences, the words which we employ have, in the course of our previous studies, been brought to a sense as unequivocal as the phraseology of mathematicians; thus presupposing the most difficult part of the logical problem already solved.

## NOTE 48.

The meaning which Bacon attached to this expression seems sufficiently obvious from a passage in the *Cogitata et Visa*, where, speaking of the difficulty of rightly estimating the opinions of some of the ancient philosophers, he remarks: "*Dubium non est quin si opiniones eorum in propriis extarent operibus, majorem firmitudinem habituræ fuissent, cum theoriarum vires in aptâ et se mutuo sustinente partium harmoniâ, et quâdam in orbem demonstratione consistant, ideoque per partes traditæ infirmæ sunt,*" etc. That is, an argument arising from the mutual coherency and concatenation of the parts; "the conviction arising from which kind of proof may be compared to what they

call the *effect* in architecture, or other works of art, a result from a great number of things so-and-so disposed and taken into one view." The following passages illustrate Bacon's meaning: "Scientiarum omnium robur, instar fascis illius senis, non in singulis bacillis, sed in omnibus vinculo conjunctis consistit. Etenim symmetria scientiæ, *singulis scilicet partibus se invicem sustentibus* est, et esse debet, vera atque expedita ratio refellendi objectiones minorum gentium: contra si singula axiomata, tanquam baculos fascis, seorsum extrahas, facile erit ea infirmare et pro libito aut flectere aut frangere."—*De Augm.*, lib. i. And again: "Quævis enim philosophia integra se ipsam sustentat: atque dogmata ejus sibi mutuo et lumen et robur adjiciunt."—*De Augm.*, lib. iii. Compare Bentham's "self-corroborative chain of evidence," (Mill's Logic, book iii. chap. 23), and Bishop Butler's remarks on the *multiplying* force of probable evidence (Analogy, part 2, chap. 7); also Burlamaqui, part ii. chap. 14. 3. Aristotle certainly did not understand "demonstration in circle," as Bacon believes him to have done; but, as the passages are long, I must merely refer to them. They may be found in the *Analytica Priora*, ii. 5, and *Analyt. Posteriora*, i. 3, 5, Bekker's Edition.

## NOTE 49.

"We shall then use our understanding aright," Locke remarks, "when we entertain all objects in that way and proportion, that they are suited to our faculties; and upon those grounds they are capable of being proposed to us; and not peremptorily or intemperately *require demonstration, or demand certainty, where probability only is to be had*, and which is sufficient to govern all our concernments."—*Introduction*. See another passage, book iv. chap. 11, 10.

## NOTE 50.

Stewart thinks that the practice of committing to writing our acquired knowledge is, in some respects, unfavourable to the faculty of memory, by superseding, to a certain degree, its exertions; but that the advantages with which it is attended in other respects are so important as greatly to over-balance



this trifling inconvenience. He specifies two of these advantages: first, that it enables one generation to transmit its discoveries to another, and thus gives rise to a gradual progress in the species; and, secondly, it lays a foundation for a perpetual progress in the intellectual powers of the individual. He also remarks, that the most effectual way of fixing the particulars of our knowledge very permanently in our memory, is to refer them to general principles. The Helps to Memory enumerated by Locke are Attention, Repetition, Pleasure, and Pain. He seems to have in view the aid here mentioned by Bacon, when he speaks of the use of words for *recording* our thoughts, and of the advantage possessed by mathematicians in diagrams and figures. (Book iv. chap. 3). The influence of *attention* on the memory is noticed by Bacon, Nov. Org. lib. ii. Aph. xxvi.: "Quæ expectantur et *attentionem* excitant melius haerent quam quæ prætervolant. Itaque si scriptum aliquid vicies perlegeris, non tam faciliter memoriter disces, quam si illud legas decies, tentando interim illud recitare, et ubi deficit memoria, inspiciendo librum."

## NOTE 51.

Stewart mentions an objection which he says is applicable to all artificial memories; namely, that they accustom the mind to associate ideas by accidental and arbitrary connexions. The same writer remarks, that every acquisition of knowledge, so far from *loading* the memory, gives us a firmer hold of all that part of our previous information, with which it is, in any degree, connected; for, as every object of our knowledge is related to a variety of others, in proportion to the multiplication of mutual relations among our ideas (which is the natural result of our growing information), the greater will be the number of occasions on which they will recur to the recollection, and the firmer will be the root which each idea, in particular, will take in the memory.

## NOTE 52.

In Nov. Org. lib. ii. Aphor. xxvi. he enumerates six lesser forms of helps to the memory: "Abscissio infiniti; deductio in-

tellektualis ad sensibile; impressio in affectu forti; impressio in mente purâ; multitudo ansarum; præexpectatio.”

## NOTE 53.

This description of Recollection strongly resembles Brown's analysis of it. See Lecture xli.

## NOTE 54.

Brown differs from Bacon as to the principle on which order assists the Memory. See Lecture xli.

## NOTE 55.

Aristotle distinguishes three degrees of the habit of Memory. First, when the thing presents itself to our memory spontaneously, this is the most perfect; second, when the thing is forgotten for some time, and then casually brought into view again; third, when we cast about and search for what we would remember. This last Aristotle calls Reminiscence. To the objection that the will to remember a thing implies the knowledge of it already, Reid replies, that we remember something relating to it, i. e. have a relative conception of it, and by attending to what we do remember we are led to it by a train of thought. Aristotle denies that brutes have Reminiscence, but allows them Memory. Reid suggests another difference between the memory of men and brutes; namely, that the latter do not measure time or possess any distinct knowledge of intervals of time. The student will remember Locke's disjunctive reasoning to prove that brutes have memory. Stewart allows to brutes the powers of sensation, perception, and memory. Whether they possess the power of recollection he thinks doubtful, and that, if some of the more sagacious of them do, it is certainly in a very inconsiderable degree. He thinks the boundary is drawn between the animal and rational nature by the capacity of artificial language, which none of the brutes possess, even in the lowest degree.

## NOTE 56.

Stewart recommends the propriety of associating with every

important general conclusion some particular example or illustration, calculated, as much as possible, to present an impressive image to the power of conception. "Hence," he remarks, "by the way, a strong argument in favour of the practice recommended by Bacon, of connecting *emblems* with *prenotions*, as the most powerful of all the *adminicles* to the faculty of memory, and hence the aid which this faculty may be expected to receive, in point of promptitude, if not of correctness, from a lively imagination. Nor is it the least advantage of this practice, that it supplies us, at all times, with ready and apposite illustrations to facilitate the communication of our general conclusions to others."

## NOTE 57.

As a result of the discussions contained in this Book, he classes as desiderata, *Experientia Literata*, sive *Venatio Panis*, *Organum Novum*, *Topicæ Particulares*, *Elenchi Idolorum*, and *De Analogiâ Demonstrationum*.

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## NOTES ON THE SEVENTH BOOK DE AUGMENTIS SCIENTIARUM.

## NOTE 1.

AN opinion of Aristotle, who held that the moral virtues are not implanted by nature, but acquired by custom; a view which, he says, is supported by the etymology of the word (*'ἠθος* from *ἔθος*).—See his *Ethics*, book ii. In Butler's *Analogy*, Part i. chap. 5, may be found some valuable observations on the important relation which habits bear to the virtuous principle.

## NOTE 2.

One of the practical rules given by Aristotle for the attainment of virtue.

## NOTE 3.

“We can almost forgive all the faults of Bacon’s life,” says Mr. Macaulay, “when we read that singularly graceful and dignified passage, ‘Ego certe . . . . . exequar.’ This *philanthropia*, which, as he said in one of the most remarkable of his early letters, ‘was so fixed in his mind, as it could not be removed,’ this majestic humility, this persuasion, that nothing can be too insignificant for the attention of the wisest, which is not too insignificant to give pleasure or pain to the meanest, is the *great characteristic distinction, the essential spirit, of the Baconian philosophy*. We trace it in all that Bacon has written on Physics, on Laws, on Morals; and we conceive, that from this peculiarity all the other peculiarities of his system directly, and almost necessarily, sprang.” And again: “The chief peculiarity of Bacon’s philosophy seems to us to have been this, that it aimed at things altogether different from those which his predecessors had proposed to themselves. This was his own opinion. ‘Finis scientiarum,’ says he, ‘a nemine adhuc bene positus est.’—*Nov. Org.*, lib. i. Aph. LXXXI. And again: ‘Omnium gravissimus error in deviatione ab ultimo doctrinarum fine consistit.’—*De Augm.*, lib. i. ‘Nec ipsa meta,’ says he elsewhere, ‘adhuc ulli quod sciam, mortalium posita est et defixa.’—*Cogitata et Visa*. The more carefully his works are examined, the more clearly, we think, it will appear, that this is the real clue to his whole system, and that he used means different from those used by other philosophers, because he wished to arrive at an end altogether different from their’s. What then was the end which Bacon proposed to himself? It was, to use his own emphatic expression, ‘fruit.’ It was the multiplying of human enjoyments, and the mitigating of human sufferings. It was ‘the relief of man’s estate.’—*Advancement of Learning*, book i. It was ‘commodis humanis inservire.’—*De Augm.*, lib. vii. chap. 1. It was ‘efficaciter operari ad sublevanda vitæ humanæ incommoda.’—*De Augm.*, lib. ii. chap. 2. It was ‘dotare vitam humanam novis inventis et copiis.’—*Nov. Org.*, lib. i. Aph. LXXXI. It was ‘genus humanum novis operibus et po-

testatibus continuo dotare.'—*Cogitata et Visa*. This was the object of all his speculations in every department of science; in natural philosophy, in legislation, in politics, in morals. Two words form the key of the Baconian doctrine, Utility and Progress. The ancient philosophy disdained to be useful, and was content to be stationary."—*Edinburgh Review*, July, 1837.

## NOTE 4.

The two important questions of Moral Philosophy, according to Smith, are, that concerning the nature of virtue, and that concerning the principle of approbation. (See also Mackintosh). The first, alone, has any influence on our conduct. Bacon does not notice the latter at all. Aristotle (*Ethics*, book ii.) only treats of the nature of virtue as subservient to the important practical question as to how it may be best attained.

## NOTE 5.

Mr. Mill (book v. chap. 7) has well pointed out the futility of the inquiries of the ancients as to the *summum bonum*; they were all infected with a fallacy of ambiguity; the ambiguous word being Evil, or its contrary correlative, Good, which sometimes meant what is good for oneself, at other times, what is good for other people. "The philosophers of old," says Locke (book ii. chap. 21), "did in vain inquire, whether *summum bonum* consisted in riches, or bodily delights, or virtue, or contemplation. And they might as reasonably have disputed whether the best relish were to be found in apples, plums, or nuts; for as pleasant tastes depend not on the things themselves, but their agreeableness to this or that particular palate, wherein there is great variety; so the greatest happiness consists in the having those things which produce the greatest pleasure, and in the absence of those which cause any pain. Now these, to different men, are very different things." Similarly, John Brown (on Shaftesbury) remarks it as a general error of all moralists, in their inquiry into the sources of human happiness, that they have considered it as arising from one particu-

lar source, not perceiving that it must vary with the perceptions, passions, and desires of the individual.

The following brief summary of the views of the ancient philosophers respecting the *summum bonum*, may be useful to the student: "Hæ de finibus, ut opinor, retentæ defensæque sententiæ: primum simplices quatuor: Nihil bonum, nisi honestum, ut Stoici: Nihil bonum, nisi voluptatem, ut Epicurus: Nihil bonum, nisi vacuitatem doloris, ut Hieronymus: Nihil bonum, nisi naturæ primis bonis aut omnibus aut maximis frui, ut Carneades contra Stoicos disserebat. Hæc igitur simplicia. Illa mixta. Tria genera bonorum, maxima animi, secunda corporis, externa tertia, ut Peripatetici; nec multo veteres Academici secus. Voluptatem cum honestate Dinomachus et Callipho copulavit. Indolentiam autem honestati Peripateticus Diodorus adjunxit. Hæ sunt sententiæ, quæ stabilitatis aliquid habeant: nam Aristonis, Pyrrhonis, Herilli, nonnullorumque aliorum evanuerunt." (For the opinions of the three last, see Cic. de Off. i. 2; and de Fin. iv. 16.) Tusc. Quæst. lib. v. 30. "Tres sunt fines expertes honestatis, unus Aristippi vel Epicuri, alter Hieronymi, Carneadis tertius: tres, in quibus honestas cum aliquâ accessione, Polemonis, Calliphonis, Diodori. Una simplex, cujus Zeno auctor, posita in decore tota, id est, in honestate."—*De Fin.* ii. 11. In Aristotle's first book of Ethics may be found discussed at large various opinions on the *summum bonum*. St. Augustine (de Civitate Dei) writes, that Varro remarked that in his time there were two hundred and eighty-eight opinions on the *summum bonum*.

#### NOTE 6.

It is well observed by Paley, that there is but one kind of *hope* which is of any value towards happiness, namely, when there is something to be done towards attaining the object. . . . "A man who is earnest in his endeavours after the happiness of a future state, has, in this respect, an advantage over all the world; for he has constantly before his eyes an object of supreme importance, productive of perpetual engagement and activity, and of which the pursuit (which can be said of no pursuit

besides) lasts him to his life's end."—*Moral Philosophy*, book i. chap. 6. . . . . Compare the Stoical decision respecting Plato and Dionysius (Cic. de Fin. iv. 20): "Negat Platonem, si sapiens non sit, eâdem esse in causâ, quâ tyrannum Dionysium. Huic mori optimum esse, *propter desperationem sapientiae*; illi, *propter spem, vivere.*" But on this subject Bishop Butler suggests an important caution: "It was doubtless intended that life should be very much a pursuit to the gross of mankind. But this is carried so much farther than is reasonable, that what gives immediate satisfaction, i. e. our present interest, is scarce considered as our interest at all. It is inventions, which have only a remote tendency towards enjoyment, perhaps but a remote tendency towards gaining the means only of enjoyment, which are chiefly spoken of as useful to the world. And though this way of thinking were just with respect to the imperfect state we are now in, where we know so little of satisfaction without satiety, yet it must be guarded against when we are considering the happiness of a state of perfection, *which happiness, being enjoyment and not hope*, must necessarily consist in this, that our affections have their objects and rest in those objects as an end, i. e. be satisfied with them."—(*Sermon upon the Love of God*). Compare also Pope (Essay on Man) :

"Hope humbly then; with trembling pinions soar;  
 Wait the great teacher Death; and God adore.  
 What future bliss, he gives not thee to know,  
 But gives that Hope to be thy blessing now.  
 Hope springs eternal in the human breast:  
 Man never Is, but always To be blest:  
 The soul, uneasy and confined from home,  
 Rests and expatiates in a life to come."

## NOTE 7.

Aristotle divides goods into three classes: those of the mind, those of the body, and those consisting in externals.

## NOTE 8.

The best test of a confirmed habit of virtue, according to

Aristotle, is the pleasure or pain which accompanies the performance of virtuous actions.

## NOTE 9.

“Casibus conscientiæ.” The two useful parts of moral philosophy, according to Smith, are ethics and jurisprudence; casuistry ought to be rejected altogether; and the ancient moralists, he says, appear to have judged much better in not affecting any such nice exactness.

## NOTE 10.

Paley points out the danger of setting out from moral maxims, and exemplifies it by the instance of Aristotle laying it down as a fundamental and self-evident principle, that nature intended barbarians to be slaves, and then proceeding to deduce from this maxim a train of conclusions to justify the policy that then prevailed. Moral Philosophy, book i. chap. 5.

## NOTE 11.

Cumberland thus argues out the propriety of sacrificing life for the public good: “Immò si moriamur pro Bono Publico, minus amittimus ejus causà, quàm indè jamjam accepimus. Amittimus enim tantùm incertam futurorum, si vixerimus, gaudiorum spem; immò potiùs certum est vix ullam singulis spem superesse posse, ubi Bonum Communionis conculcatur; accepimus autem indè realem vitæ omniumque quibus ornati fuimus perfectionum possessionem.”—*De Leg. Nat. Proleg.*

## NOTE 12.

Very similar is the analogical argument developed by Bishop Butler. Bacon’s argument, however, is of a positive kind; Butler’s is rather for the purpose of answering objections: “On the other hand, if there be an analogy or likeness between that system of things, and dispensation of Providence, which revelation informs us of, and that system of things, and dispensation of Providence, which experience, together with reason, informs us of, i. e., the known course of nature; this is a presumption that



they have both the same author and cause; at least, so far as to answer objections against the former's being from God, drawn from anything which is analogical, or similar to what is in the latter, which is acknowledged to be from him." Compare Cumberland: "Immò Sacras Scripturas ideo credimus à Deo seu Naturæ Auctore proficisci, quoniam Leges Naturales ubique illustrant, muniunt, promovéntque."—*De Leg. Nat. Proleg.*

## NOTE 13.

Pythagoras is said, by some authors, to have used those words on the occasion of being asked what he meant by calling himself "a Philosopher" (the invention of which name is ascribed to him).

## NOTE 14.

So Smith: "Nature has not prescribed to us this sublime contemplation as the great business and occupation of our lives. She only points it out to us as the consolation of our misfortunes. The stoical philosophy prescribes it as the great business and occupation of our lives."

## NOTE 15.

For a statement and refutation of the tenets of Aristippus and the Cyrenaic school, see Cicero de Finibus, lib. ii. 13. For those of Pyrrho and Herillus, see Cicero's Offices, book i. 2; and De Finibus, book iv. 16.

## NOTE 16.

This love of tranquillity and retirement has been resolved by Cicero into the love of power: "Multi autem et sunt et fuerunt, qui, eam, quam dico tranquillitatem expetentes, a negotiis publicis se removerint, ad otiumque perfugerint. In his et nobilissimi philosophi, longæque principes, et quidam homines severi et graves, nec populi, nec principum mores ferre potuerunt, vixeruntque nonnulli in agris, delectati re suâ familiari. His idem propositum fuit, quod regibus, ut ne quâ re egerent, ne cui parerent, libertate uterentur, cujus proprium est, sic vivere ut velis. Quare cum hoc commune sit potentia cupidorum cum

iis, quos dixi, otiosis, alteri se adipisci id posse arbitrantur, si opes magnas habeant: alteri si contenti sint et suo et proprio." (See the Offices, book i. 20, 21).

## NOTE 17.

So Paley mentions, as one of the main articles of human happiness, the exercise of our faculties, either of body or mind, in the pursuit of some engaging end. Mor. Phil. book i.

## NOTE 18.

With this opinion of Socrates agrees that of Bishop Butler, who points out from an examination of the constitution of our nature what our general aim should be, in our passage through this world; namely, to endeavour chiefly to escape misery, keep free from uneasiness, pain, and sorrow, or to get relief and mitigation of them; to propose to ourselves peace and tranquillity of mind, rather than pursue after high enjoyments. (Sermon on Compassion.)

## NOTE 19.

"Tota enim Philosophorum vita, ut ait Socrates, commentatio mortis est." (*μελέτη τοῦ θανάτου.*) See Cicero's Tusc. Quæst. i. 30. Plato (Phædo, xii.) and Cicero (Tusc. Quæst. i. 30, 31), draw quite an opposite conclusion from this habitual preparation for death. So also Smith, when accounting for the fact, that the propriety of voluntary death was a doctrine common to all the ancient philosophers. (See Systems of Moral Philosophy, sec. 2).

## NOTE 20.

Dr. Reid remarks, that the word *καθηκον* (*officium*) extended both to the *honestum* and the *utile* of the Roman moralists, and comprehended every action performed either from a sense of duty, or from an enlightened regard to our own interest. In English we use the word *reasonable* with the same latitude, and, indeed, almost exactly in the same sense in which Cicero defines *officium*. "Id quod cur factum sit, ratio probabilis reddi possit."—*Dug. Stewart*. Reid also remarks, that it is more extensive

than the word *duty*, by which it is commonly rendered, for the word *duty* is commonly applied only to what the ancients called *honestum*. Bacon restricts the term to our social duties.

## NOTE 21.

For some admirable remarks on the subject of Experience in special departments of practice, see Archbishop Whately's Rhetoric, part i. chap. 2, sec. 7, and his Third Lecture on Political Economy.

## NOTE 22.

Brown notices and accounts for a similar effect resulting from devotion to particular sciences. (Lecture xlv.)

## NOTE 23.

Bacon has been placed by Bayle, Roscoe, and other eminent writers, amongst those apologists of Machiavel, who held that the real design of "The Prince" was, under the mask of giving lessons to sovereigns, to open the eyes of their oppressed subjects, and that he assumed this mask in the hope of thereby securing a freer circulation to his doctrines. The language used by Bacon in this passage seems somewhat ambiguous. But he has elsewhere expressed his opinion of Machiavel's moral demerits in terms as strong and unequivocal as language can furnish. Thus, De Augmentis, lib. viii. cap. 2: "Quod enim ad malas artes attinet; si quis Machiavello se dederit in disciplinam, qui præcipit virtutem ipsam non magnopere curandam, sed tantum speciem ejus, in publicum versam: quia virtutis fama et opinio homini adjumento sit, virtus ipsa impedimento; quique alio loco præcipit; ut homo politicus illud tanquam fundamentum prudentiæ suæ substernat, quod præsupponat, homines non recte nec tuto ad ea, quæ volumus, flecti aut adduci posse, præterquam solo metu," etc. See also book vii. cap. 3: "Annon et hoc verum est, juvenes multo minus politicæ quam ethicæ auditores idoneos esse, antequam religione et doctrinâ de moribus et officiis plane imbuantur: ne forte judicio depravati et corrupti, in eam opinionem veniant, non esse rerum differentias

morales veras et solidas, sed omnia ex utilitate aut successu metienda . . . . sic enim Machiavello dicere placet, 'Quod si contigisset Cæsarem bello superatum fuisse, Catilinâ ipso fuisset odiosior,' etc.

## NOTE 24.

Proverbs, xviii. 2: "A fool hath no delight in understanding, but that his heart may discover itself." Bacon quotes from the Vulgate.

## NOTE 25.

The word *πάθος*, which answers to *passion* in the Greek language, is rendered *perturbatio* by Cicero.

## NOTE 26.

Brown also, in noticing the great defect of the ancient philosophers in mental science, namely, their total neglect of the analytical investigation of the phenomena of the mind, remarks, that the Peripatetics and Stoics did employ much dialectic subtlety in distinctions that may seem at first to involve such an analysis; but that even these distinctions were verbal, or little more than verbal.

## NOTE 27.

"The ethical disquisitions of Bacon are almost entirely of a practical nature. Of the two theoretical questions so much agitated, in both parts of this island, during the eighteenth century, concerning the *principle* and the *object* of moral approbation, he has said nothing; but he has opened some new and interesting views with respect to the influence of *custom* and the formation of *habits*; a most important article of moral philosophy, on which he has enlarged more ably and more usefully than any writer since the days of Aristotle."—*Stewart*.

## NOTE 28.

See Paley's Moral Philosophy, book i. chap. 5, on the influence of *imitation* in the generation of our moral sentiments.

## NOTE 29.

The researches to which Bacon here alludes form the object of

*Ethology*, as conceived by Mr. Mill. This writer proposes to give that name (derived from ἠθος, character), to the science which determines the kind of character produced, in conformity to the general laws of the mind, by any set of circumstances, physical and moral. It is subordinate to, and borrows its premises from, Psychology, and furnishes the *generalia* or first principles on which the Art of Education is founded. "The progress of this important but most imperfect science," says Mr. Mill, "will depend upon a double process: first, that of deducing theoretically the ethological consequences of particular circumstances of position, and comparing them with the recognised results of common experience; and, secondly, the reverse operation, increased study of the various types of human nature that are to be found in the world; conducted by persons not only capable of analyzing and recording the circumstances in which these types severally prevail, but also sufficiently acquainted with psychological laws, to be able to explain and account for the characteristics of the type by the peculiarities of the circumstances; the residuum, if any, being set down to the account of congenital predispositions."

## NOTE 30.

Aristotle (*Ethics*, book iii.), proves that our habits are voluntary, as being created by a series of voluntary actions: "But, it may be asked, does it depend merely on our own will to correct and reform our bad habits? It certainly does not; neither does it depend on the will of a patient, who has despised the advice of a physician, to recover that health which has been lost by profligacy. When we have thrown a stone we cannot restrain its flight; but it depended entirely on ourselves whether we should throw it or not." Actions, according to Aristotle, are voluntary throughout; habits only as to their beginnings.

## NOTE 31.

This is an error. It is a familiar observation that all the senses are improved by practice; and not only so, but since Berkeley's time it has been almost universally admitted, that the

visual perception of objects is acquired by habit, and in fact learned like a language.

## NOTE 32.

“In our conduct,” says Paley, “we are, for the most part, determined at once, and by an impulse, which is the effect and energy of *pre-established habits*. And this constitution seems well adapted to the exigencies of human life, and the imbecility of the moral principle. For in the current occasions and rapid opportunities of life there is oftentimes little leisure for reflection; and were there more, a man who has to reason about his duty, when the temptation to transgress is upon him, is almost sure to reason himself into an error.” He thinks that our responsibility and the exercise of virtue really lie in the *forming* of habits. See Paley, book i. chap. 6 and 7. Aristotle thus defines virtue: “Ἔστιν ἡ ἀρετὴ ἕξις προαιρετικὴ ἐν μεσότητι.

## NOTE 33.

The three practical rules given by Aristotle for the attainment of propriety of affection and action, are: First, to keep at a distance from the most blameable extreme. Second, to consider to which of the two extremes we are most prone, and bend our character to the opposite direction. Third, above all, to beware of the blandishments of pleasure.

## NOTE 34.

“When virtue is become habitual, when the temper of it is acquired, what was before confinement ceases to be so, by becoming choice and delight. Whatever restraint and guard upon ourselves may be needful to unlearn any unnatural distortion or odd gesture; yet, in all propriety of speech, natural behaviour must be the most easy and unrestrained.”—*Butler's third Sermon upon Human Nature*.

## NOTE 35.

This stoical apathy would not, according to Smith, indicate a sound frame of mind: “By the perfect apathy which the stoical philosophy prescribes to us, by endeavouring, not merely to

moderate, but to eradicate all our private, partial, and selfish affections,—by suffering us to feel for whatever can befall ourselves, our friends, our country, not even the sympathetic and reduced passions of the impartial spectator,—it endeavours to render us altogether indifferent and unconcerned in the success or miscarriage of every thing which nature has prescribed to us as the proper business and occupation of our lives.” So also Butler: “In general experience will shew, that, as want of natural appetite to food supposes and proceeds from some bodily disease, so the apathy the Stoics talk of as much supposes, or is accompanied with somewhat amiss in the moral character, in that which is the health of the mind.”

## NOTE 36.

From a review of the subjects discussed in this book, he classes as *Desiderata*, *Satira Seria*, sive *de Interioribus Rerum*, and *Georgica Animi*, sive *de Culturâ Morum*.

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 NOTES ON THE PREFACE TO 'THE NOVUM ORGANUM.

## NOTE 1.

The following Aphorism is a development of the remarks contained in the first paragraph: “*Danda etiam est cautio intellectui, de intemperantiis philosophiarum, quoad assensum præbendum aut cohibendum; quia hujusmodi intemperantiæ videntur idola figere et quodammodo perpetuare, ne detur aditus ad ea summovenda. Duplex autem est excessus; alter eorum qui facile pronunciant, et scientias reddunt positivas et magistrales, alter eorum qui acatalepsiam introduxerunt; et inquisitionem vagam sine termino. Quorum primus intellectum deprimit, alter enerivat. Nam Aristotelis philosophia, postquam cæteras philosophias (more Ottomanorum erga fratres suos) pugnacibus confutationibus contrucidasset, de singulis pronuciavit. . . . . At Plato-*

nis schola *acatalepsiam* introduxit, primo tanquam per jocum et ironiam, in odium veterum Sophistarum, Protagoræ, Hippiaë et reliquorum, qui nihil tam verebantur, quam ne dubitare de re aliquâ viderentur. At nova Academia *acatalepsiam* dogmatizavit. et ex professo tenuit: quæ licet honestior sit, quam *pronunciandi* licentia, cum ipsi pro se dicant, se minime confundere inquisitionem ut Pyrrho fecit et Ephectici, sed habere quod sequantur ut probabile, licet non haberent quod teneant ut verum; tamen postquam animus humanus de veritate inveniendâ semel desperaverit, omnino omnia fiunt languidiora: ex quo fit, ut deflectant homines potius ad amœnas disputationes et discursus, et rerum quasdam peragrations, quam in severitate inquisitionis se sustineant.”—*Nov. Org. Aph.* LXVII. Cf. also De Augm. lib. i.: “In justis tractatibus de scientiis utrumque extremum vitandum censo, tam Velleii Epicurei, nil tam metuentis, quam ne dubitare de re aliquâ videretur; quam Socratis et Academiae omnia in dubio relinquentium.” Locke derives scepticism from dogmatism. (See Introduction to Essay on Human Understanding). Brown shews well that both dogmatism and scepticism originate in partial views of our intellectual constitution. (See Lecture Third). “The reasonings of the Pyrrhonians and Dogmatists are balanced in a noble passage of Pascal: ‘L’unique fort des Dogmatistes, c’est qu’en parlant de bonne foi et sincerement, on ne peut douter des principes naturels.’ . . . ‘Les principes se sentent, les propositions se concluent.’ . . . ‘Il n’y a jamais eu de Pyrrhonien effectif et parfait.’ ‘La nature soutient la raison impuissante.’ He concludes with an observation so remarkable for range of mind and weight of authority, that it seems to us to have a higher character of grandeur than any passage in human composition, which has a mere reference to operations of the understanding: ‘La nature confond les Pyrrhoniens, et la Raison les Dogmatistes.’”—*Sir J. Mackintosh*. The most celebrated of the ancient Sceptics were Pyrrho, Cœnesidemus, and Sextus Empiricus; of the modern, Bayle and Hume.



## NOTE 2.

Sir J. Herschel (*Discourse on Natural Philosophy*) sets the character of the earlier Greek philosophers far above that of their successors. He instances Thales, many of whose speculations in natural philosophy were sound; for example, his ideas of eclipses and of the nature of the moon: his prediction of an eclipse of the sun, too, was attended with circumstances so remarkable as to have made it a matter of important investigation to modern astronomers. To Thales he adds Anaxagoras and Pythagoras. Mr. Macauley remarks: "Our great countryman evidently did not consider the revolution which Socrates effected in philosophy as a happy event, and constantly maintained that the earlier Greek speculators, Democritus in particular, were on the whole superior to their more celebrated successors. See *Nov. Org.*, lib. i. App. 71. 89; *De Augm.* lib. iii. cap. 4; *De Principiis atque Originibus; Cogitata et Visa; Redargutio Philosophiarum.*"

## NOTE 3.

Mr. Craik translates "*reductionem quandam*" "a certain reduction," which he takes to mean a drawing of the sense back to its proper function. Shaw translates, "to guard the sense by a kind of reduction;" which he thus explains: "By contriving ways of transmitting things, in a proper manner, to the senses, that a true judgment may be formed of them when thus again brought under view."

## NOTE 4.

Aphorism CXXII.: "*Certe si quis manus constantiâ atque oculi vigore lineam magis rectam, aut circulum magis perfectum se describere posse, quam alium quempiam, sibi assumat; inducatur scilicet facultatis comparatio: quod si quis asserat, se adhibitâ regulâ, aut circumducto circino, lineam magis rectam, aut circulum magis perfectum posse describere, quam aliquem alium vi solâ oculi et manûs; is certe non admodum jactator fuerit . . . .* Nostra enim via inveniendi scientias exæquat fere ingenia, et non multum excellentiæ eorum relinquit: cum omnia per certissimas

regulas et demonstrationes transigat." "On this subject," remarks Mr. Macaulay, "we think Bacon was in an error. He certainly attributed to his rules a value which did not belong to them. He went so far as to say that, if his method of making discoveries were adopted, little would depend on the degree of force or acuteness of any intellect; that all minds would be reduced to one level; that his philosophy resembled a compass or a rule, which equalizes all hands, and enables the most unpractised person to draw a more correct circle or line than the best draftsmen can produce without such aid. This really seems to us as extravagant as it would have been in Lindley Murray to announce that everybody who should learn his Grammar would write as good English as Dryden; or in that very able writer, the Archbishop of Dublin, to promise that all the readers of his Logic would reason like Chillingworth, and that all the readers of his Rhetoric would speak like Burke. That Bacon was altogether mistaken as to this point will now hardly be disputed. His philosophy has flourished during two hundred years, and has produced none of this levelling. The interval between a man of talent and a dunce is as wide as ever; and is never more clearly discernible than when they engage in researches which require the constant use of induction." Bacon does not, however, exclude ingenuity; for in Aphor. cxxi. he observes: "Subtilitatis tempus verum ac proprium aut saltem præcipuum, versari in pensitandâ experientiâ et inde constituendis axiomatibus."

## NOTE 5.

"Bono fit fato, ut antiquis suus constet honos. Nihil enim illis detrahitur, cum de viâ omnino quæstio sit. Claudus enim (ut dicitur) in viâ, antevertit cursorem extra viam. Etiam illud manifesto liquet, currenti extra viam, quo habilior sit et velocior, eo majorem contingere aberrationem."—*Aph.* lxi.

## NOTE 6.

Aphor. xxviii: "Longe validiores sunt ad subeundem assensum *anticipationes*, quam *interpretationes*; quia ex paucis collectæ, iisque maxime quæ familiariter occurrunt, intellectum statim

perstringunt, et phantasiam implent; ubi contra, *interpretationes*, ex rebus admodum variis et multum distantibus sparsim collectæ, intellectum subito percutere non possunt; ut necesse sit eas, quoad opiniones duras et absonas, fere instar mysteriorum fidei videri;" and xxix.: "In scientiis, quæ in opinionibus et placitis fundatæ sunt, bonus est usus *anticipationum* et dialecticæ; quando opus est assensum subjugare non res." Cousin (Eleventh Lecture) compares this "Anticipatio Mentis," with the *πρόληψις* of Chrysippus. Tycho Brahe thus *anticipated* nature, in taking it as certain truth that the earth must be at rest. So also Kepler, Bacon's contemporary, in imagining that the planets *must* be six in number, and must have orbits of certain dimensions, because of certain properties of numbers, and of plane and solid figures, with which he fancied they corresponded.

## NOTE 7.

In the second book "de Augmentis," he thus defines the "vera philosophia:" "Quæ mundi ipsius voces fidelissime red- dit, et veluti dictante mundo conscripta est; et nihil aliud est, quam ejusdem simulacrum et reflexio; neque addit quicquam de proprio, sed tantum iterat et resonat."

## QUESTIONS.

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### QUESTIONS ON THE PREFACE TO THE IN- STAUratio MAGNA.

Bacon mentions two false opinions as causes of the retardation of philosophy?

How did these respectively operate in retarding its progress? They took away two great incentives?

It is advantageous that all undue admiration of the attainments of the ancients should be removed?

These have been overrated in two respects?

The real extent of their information was trivial?

To what does he compare the ancient philosophy as to practical utility? What is the ground of comparison?

How does Bacon illustrate the state of learning in his day? Foundation of this illustration?

From the history of ancient philosophy, its inutility, as to discovery, is apparent by what facts?

What marks of a science, based on true principles, does Bacon insist on?

By what analogy does he confirm this latter mark?

Whence does it occur that this latter mark is usually neglected?

Quonam signo distinguuntur scientiæ quæ *in naturâ*, ab iis quæ *in opinione* fundantur, secundum Verulamium?

In contrasting the progress of the intellectual sciences with that of the mechanical arts, he employs a striking illustration?

To what does Bacon ascribe the fact, that, instead of the sciences advancing with the progress of time, they were frequently most flourishing in an early author, and subsequently degenerated?

What plea has been attempted for this?

To what sources does Bacon trace this opinion, and what account does he give of its origin?

Why was this genius for systematizing agreeable to the nature of man?

What argument does Bacon notice in defence of the ancient mode of philosophizing?

He meets this argument by a two-fold objection?

Consensus universalis quomodo applicatur a Reidio, in Pneumatologiâ?

Hæcce applicatio Ciceronis auctoritate firmatur?

Huic opinioni haud assentit Verulamius, et quare?

Give instances of the application of this argument from other writers?

Quomodo de consensu falluntur homines?

Malus effectus peculiaris statûs scientiarum?

Bacon mentions two classes of experimental philosophers; distinguish them.

Bacon mentions several classes of authors who had attempted to promote science, but had failed?

The ancient dogmatists held inconsistent opinions, according to Bacon?

In endeavouring to advance the sciences, the golden mean cannot be observed? Illustration?

Qui, ut Cartesius, aditum sibi vi fecerunt, quomodo aberrarunt quoad finem? Et quare?

Anne laudat Verulamius eos qui novum aliquid reperire conantes, partitionem laborum asciscunt?

Triplex error antiquorum in modo experiendi?

What error, into which the ancient experimental philosophers

fell, would prevent them from seeing the full advantage of Bacon's "ars indicii ab experimentis ad experimenta?"

Error of those who committed themselves to the waves of experiment?

A great part of those who devoted themselves seriously to experiment were injudicious in the nature of the tasks they selected?

In opposition to this what is the precept given by Bacon for ascending the summits of the sciences?

General and fatal error of all the experimental philosophers?

Ex divinæ Providentiæ exemplo in historiâ Creationis verum experientiæ curriculum deducit Verulamius?

By the invention of Logic, the ancients shewed they were acquainted with an important fact?

How does Archbishop Whately account for the strong terms in which Bacon sometimes appears to censure logical pursuits?

It appears from Bacon himself that he only means to condemn the use of syllogism in physics?

He allows syllogism a double utility in the popular sciences?

Aliquando damnose adhibetur syllogismus secundum Lockium?

Semper damnose secundum Professore[m] Stewart? Objectiones Stewarti contra syllogismum? Ubinam rectè applicatur syllogismus secundum Verulamium? Ubinam secundum Stewart?

Quænam duo idola adscititia ex arte logicâ?

Quare præsertim omnes hactenus infelices?

Quare parum præsidii in demonstrationibus et experimentis adhuc cognitis?

Hactenus inventa in artibus et scientiis sunt statui philosophiæ mentis bene conformia?

Where did the ancients shew their excellence, and by what methods?

Inventis magis reconditis quid necessarium? Illustratio?

Quænam ratio Verulamio viam aperuit?

Humiliatio in inventione quid vult?

Eandem et in docendo adhibet; quomodo?

His predecessors mistook the nature of invention?

Feliciter illustrat Verulamius quatenus a rebus abstrahere licet?

Those who applied themselves to the advancement of science, before the time of Bacon, may be divided into two classes; their names and characters?

What was their common error?

Into what two peculiar errors did the latter class, namely, the "Empirici," fall?

Verum opificium philosophiæ quidnam et unde eruetur?

Scientias et artes revera attollere quomodo proponit Verulamius? Quosnam errores corrigit hoc "novum fœdus"?

Verulamius per comparationem lepidam bene illustrat distinctionem inter Empiricos et Dogmaticos, et e contra verum opificium philosophiæ?

What evils does Bacon apprehend that the progress of natural philosophy may give rise to?

What does he point out as the source of these evils?

What remedies and cautions does he suggest?

Quidam theologi imperiti philosophiæ quamvis emendatæ aditum intercludunt; Quatuor causas diversas talis oppositionis enumerat Verulamius?

Commentatio Verulamii in huncce textum "Erratis nescientes Scripturas et potestatem Dei"?

Fines scientiæ et veri et falsi secundum Verulamium?



## QUESTIONS ON THE DISTRIBUTION OF THE WORK.

In what class of sciences does Bacon place his Interpretatio Naturæ?

The Organon of Bacon sets out with the same professed object as that of Aristotle?

Locke also recommends rules and assistances for the understanding to be sought for. Where?—and what caution does he recommend in such an inquiry?

Subjecta logicæ utilis et rationalis notat Professor Stewart?

Interpretatio Naturæ Baconiana et Logica Vulgaris in uno tantum consentiunt?

In tribus præcipue rebus plane differunt?

How does Mr. Mill differ from Archbishop Whately as to the connexion between Induction and Ratiocination? State his reasonings? How may they be answered?

Cuinam axiomati innititur omnis inductio secundum Mill?

Quare non recte exinde concludit Archiepiscopus Dubliniensis inductionem esse syllogismum?

Definitio Inductionis secundum Mill?

De verâ inductionis essentiâ consentiunt Baconus et Mill?

Inductio Dialectica, per enumerationem simplicem, quare non vera inductio, secundum Mill?

Quomodo ostendit Mill inductionem mathematicam non esse veram inductionem? (*See Logic, book iii. chap. ii.*)

Idola fori sunt præcipue molesta in systemate Verulamii; Quare?

Vera inductio a quonam primo applicata est, et in quemnam usum?

Bacon assails the foundation of the whole fabric of syllogism?

The use of induction far more extensive with Bacon than that of syllogism with the old logicians?

Defect of the “mediæ propositiones” educed by syllogism?

Bacon contrasts the most general axioms arrived at by induction with those assumed in syllogism?

Syllogismo ut modo concludendi duplex objectio?

Et quare inductione utitur ut meliore?

Inductio Verulamii nomine tantum congruit inductioni vulgari?

Quid vult Verulamius per axioma?

In axiomatibus constituendis duplex examinatio facienda est et quare?



Via quæ in usu est, secundum Verulamium, ad inquirendam veritatem?

Præcipuus defectus systematis Verulamiani?

Inductionis vulgaris quadruplex vitium?

Deductionis vices agnoscit Verulamius, quibusnam verbis?

Inductio per enumerationem simplicem aliquando fit demonstratio perfecta?

Exemplum inductionum perfectarum e casu unico derivatarum?

Besides furnishing the instrument, Bacon proposes to deepen and extend the foundations of the sciences, by correcting certain errors?

The term axiom is used in two distinct senses by different authors? When used to denote such propositions as "things equal to the same," &c., in what sense is it true, in what false that our knowledge depends on them? What is the accurate definition and origin of such propositions?

Three sources of error in an argument, according to Archbishop Whately?

Difference between Bacon and Whately as to the province of logic with respect to these sources of error?

What is the reason given by Archbishop Whately for excluding the second from the province of logic?

Is logic wholly useless in this branch?

Duplex sensûs culpa? Quare sensus nos decipit?

Dr. Reid's opinion on the fallaciousness of the senses?

Mr. Mill's opinion respecting the errors of sense?

Mr. Hallam's explanation of the Idola?

What are the most important aids to the senses? What kind of experiments?

Sensus et experimentum diversis muneribus funguntur?

Ad luminis naturalis accensionem tria parat in totum Verulamius?

Quânam hypothesi duo priora sufficerent?

Duæ sunt species Idolorum?

How does Bacon propose to purify the mind from its idols? Method partly direct, partly indirect?

Quatenus adhiberi potest analytica ad idola. Quatenus non?  
The sources of error in philosophizing may be reduced to three classes?

Vias universi triplici modo pertractare proponit Verulamius?  
Tres scientiarum contabulationes?

Quare haud magni facit Verulamius Historiam Naturalem Aristotelis?

In quonam præcipue deficit historia naturalis quæ propter se confecta est?

Fontes sunt varii materiæ philosophiæ?

What is the foundation of the restoration of the sciences?

How does Bacon illustrate the inutility of the doctrine of the purification of the intellect, unless succeeded by natural history?

The natural history proposed by Bacon differed, in many respects, from that known in his time?

Quomodo quoad officium?

To what does Bacon compare the precipitate eagerness of former philosophers for immediate advantages from their experiments?

And by what example does he confirm the contrary proceeding?

Historia Naturalis Verulamii quomodo quod congeriem ab aliis discrepat? Quare?

Quid vult per naturam constrictam et vexatam?

Bacon's Natural History was much more extensive than the common one?

What most important class of experiments was altogether neglected by the ancients?

How does he illustrate the importance of experiments apparently of little value?

Experimenta lucifera in se miram habent virtutem?

How does he illustrate the caution which should be observed in forming a Natural History?

Of what consists the Fourth Part of the work? Illustration of its use?

Is his division strictly logical?

Ex quibusnam constant anticipationes philosophiæ secundæ?

Tales anticipationes quare necessariae?

Judicii suspensio Verulamii non exhorrenda?

Quomodo defecerunt in hâc re qui Acatalepsiam simpliciter tenuerunt?

Causa et radix fere omnium malorum in scientiis?

Scientia activa quomodo maximi momenti? et quare?

Primus Aphorismus Verulamii quomodo a Dugald Stewart exponitur?

Quenam sententia apud Berkleium bene convenit distinctioni recognitæ, quod antecedentia non sint causæ efficientes, sed signa?

Definitio causæ physicæ apud Ciceronem errori favet de vero objecto philosophiæ naturalis? Error antiquorum de objecto scientiæ physicæ, secundum Stewart?

Quomodo solummodo vincitur natura?

Scientia et potentia humana in idem coincidunt; Quare?

Unde maxime frustratio operum?

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### QUESTIONS ON THE FIFTH BOOK DE AUGMENTIS SCIENTIARUM.

Primary division of the mental operations?

How does Bacon express the connexion between the Intellectual and Moral Faculties?

How does he compare the offices of Logics and Ethics, and to what common head does he refer them?

Brown allows that his four-fold division of the objects of inquiry is scarcely logical?

How does Bacon differ from Brown as to this division? How from Paley?

Whence, according to Brown, the necessity of Political Science?

How, according to Stewart, is the Science of Politics connected with the other branches of Moral Philosophy?

Bacon's limitation of the province of the doctrine concerning the use and objects of the faculties of the human mind, necessarily excludes the consideration of a most important part of our mental economy?

Shew that "Phantasia" is an "instrumentum commune" to the Reason and the Will?

How does it possess influence in matters of religion?

Why does he take no notice of Phantasia as a part of our Mental Constitution?

"Phantasia non parit scientias." Is this true?

Rationales scientiæ quare minime placent?

In what strong language does Bacon state the dependence of the other sciences on a system of rational logic?

How does he illustrate the use of such a study to the inquiring mind?

How does Brown point out the importance of the same?

Fundamentum legum investigationis in omni scientiâ?

How does Mr. Mill explain the expression, "Rationales scientiæ artes artium ponendæ sunt"?

On what does Bacon found his division of Logic?

What part of Logic, as divided by Bacon, does Brown conceive of most importance to the philosophical student?

In what part of this division did the ancient dialectics completely fail?

Bacon shews, from three considerations, that the science of invention was a desideratum?

How does he prove this from ancient history? He adduces Egyptian mythology for the same purpose?

Grecian traditions do not invalidate the assertion?

Qualis inveniendi methodi capacia sunt bruta? Exempla?

The form of induction proposed by logicians was faulty?

That Bacon contemplated a different use of this faulty induction, from that intended in logical works, is manifest from his objection to it?

Periculum ex neglectâ instantiâ contradictoriâ quomodo illustrat Baconus? Inductionis vulgaris quadruplex vitium?

What was there strange in the prevalence of the dialectic form of induction, and how is it accounted for?

Bacon illustrates the subordinate place assigned to particulars?

Shew that Bacon's arguments against syllogism were directed against the abuse of it by the schoolmen?

Bacon allows more utility to syllogism than Locke?

In this enumeration Bacon seems to agree with a celebrated doctrine of Locke?

Duplex officium Inductionis?

Brown and Bacon both mention abstraction as a source of error, but in different senses?

Meaning of the word *abstraction* in Bacon?

What evils in philosophy arose from the deficiency in syllogism?

How does Bacon express the injurious effects of the Acataleptic philosophy on science, and to what does he ascribe it?

Chief error of the Academics and Sceptics?

Trace the progress of the Academic sect?

By what things, according to the Academics, is the life of the wise man guided? And why?

With regard to the authority to be given to the evidence of sense, Bacon remarks two extremes?

On what principles did the ancient Sceptics found their systems?

How does Bacon shew that these principles are not true in the sense that would warrant the sceptical conclusion?

To what sources, according to Bacon, should the ancient Sceptics have traced the errors and defects of the prevalent philosophical systems?

Retorqueant Acataleptici illum detrahere ab intellectu; quomodo cavet?

Necessitas vel utilitas adminiculorum intellectui subministrandorum eâdem analogâ nititur a Verulamio et Stewart?

Insignia exempla usûs regularum et artis ad inquisitionem dirigendam profert Stewart?

Division of the "Ars Indicii?" Different objects of these divisions?

Distinguit Verulamius inter casum, experientiam et observationem?

Next to the investigation of the laws of nature, what does Bacon conceive to be the most effectual way of advancing useful science?

What does *Experientia Literata* treat of?—And how is it limited?

The *Novum Organum* has two offices?

Variatio experimenti tripliciter fit?

Cuinam præcipue variationi cura adhibenda? Quare?

Fabula illustrans errorem variationis in Quanto?

Translatio experimenti ubinam frequentissime fit? Quare?

Opinio Verulamii de comodo ex translatione experimenti?

Maxima tamen non inde speranda?

In compulsionibus experimenti quare minus moratur?

Quare potius spectant ad *Novum Organum*?

De vero scientiæ objecto verbis consentiunt Baconus et Plato, revera differunt? Quomodo *forma* differt a causâ? (*See Mill's Logic*, book iii. xxii. 4.)

Quonam sensu de *formis* loquitur Baconus?

Veri philosophi officium quoad finem indicat Verulamius, tractans de applicatione experimenti?

Logica objectio divisioni modorum?

How does Bacon define the "sortes experimenti?" And what does he say of this method?

He mentions a case in which it may be useful, but in this he is scarcely consistent?

With respect to "*Experientia Literata*," what caution does he impress upon us?

What does he "perpetually inculcate?"

"*Promptuaria*" is common to two sciences?

The "*Topica Generalis*" is useful in two respects?

Bacon quotes a remarkable maxim of Plato's which confirms

Brown's assertion, that hypotheses are, in some sense, essential to philosophy?

Analysis of the "Topica Particularis?"

How does Bacon express the dependence of this branch of logic on the progress of physics?

Monitum Verulamii de Topicis Particularibus?

What is the object of the Art of Judgment?

In this art, as commonly received, there are two kinds of proof?

What is the essential difference in the mode of judgment in these two?

Why was the art of judgment, by syllogism, so much attended to?

Bacon gives two divisions of judgment by syllogism?

What part of the ancient logic does Bacon seem to consider perfect?

The doctrine "de Elenchis" seems at first sight unnecessary?

Why, however, is it safest to retain it?

In one particular case the doctrine "de Elenchis" is most important?

What was the subject of the doctrine de Elenchis Hermenia?

To what part of Bacon's division is the physical consideration of these attributes referred? What is "Philosophia Prima?"

In making this a distinct division, he differs from Aristotle?

Distinguish "Philosophia Prima," "Physica," and "Metaphysica." Derivation of Metaphysics?

In what way ought the part of Logic concerning the Predicaments be treated, according to Bacon?

Locke makes a division of prejudices somewhat similar to Bacon's? Why, principally, does he make the distinction?

What strange name does Locke give to their origin, and how does he defend it?

What instances does Locke give of its influence on the intellectual habits?

Stirps errorum et philosophia falsa genere triplex est? Magis est culpandus Aristoteles in philosophiâ sophisticâ quam moderni

ejus sectatores, scil. scholastici? Philosophia empirica magis deformia et monstrosa eduxit quam sophistica; Quare?

Important distinction between the two classes of Idols noticed by Bacon? Only method of treating the *Idola innata*?

To what source does Bacon trace the tendency of the mind to make out relations amongst objects really unlike and singular?

Sir William Hamilton's explanation of the similitude of Plato's Cave? How, does he state, has Bacon misconceived it?

Maximum et radicale discrimen ingeniorum?

Quid genus Idolorum molestissimum?

Remedium quod præsto est malo mederi non potest?

Idolorum fori duo genera?

Quid genus facilius ejicitur, et quare?

Tres gradus pravitatis et erroris in verbis notat Verulamius?

Utilitas definitionum in aliis scientiis haud constat exemplo Matheseos, ut volunt Lockius et Reidius;—quare, secundum Stewart?

Species demonstrationum? What is *demonstratio in orbem*?

How does Locke explain the common definition of logic?

Locke has here pointed out a subject, noticed by Lord Bacon as a desideratum in logical science?

Bacon speaks of a fault, which he considers more dangerous than that noticed by Locke, of demanding higher proofs than the subject admits of.

The proper help to memory, according to Bacon?

Has Locke omitted this?

What is the common objection to endeavouring after feats of memory? And why does Bacon refuse to join in it?

Why is the term "overload," in general, an improper one as applied to the memory?

What objections does he make to the aids of memory adopted in his time?

When making these objections he alludes to the prevalent philosophical character of his mind and its probable origin?

He notices two objections to artificial memory to which he does not assent?



What instances does he give of the manner in which a "prænotio" may be obtained?

Lord Bacon has described recollection in terms strikingly accordant with Brown's analysis of it?

Aristotle's theory of recollection?

Brown differs from Lord Bacon as to the principle on which order assists the memory?

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### QUESTIONS ON THE SEVENTH BOOK DE AUGMENTIS SCIENTIARUM.

Provincia Ethicæ?

Bacon divides the science of ethics into two principal doctrines; office of each?

Bacon's general objection to all the ancient inquiries into the *summum bonum*? How does Locke point out the futility of the same? How does Mr. Mill?

Quidnam, secundum Verulamium, ethnicis antiquis locum theologiæ supplevit?

Quare in scientiâ ethicâ omnis ista de summo bono disputatio disparuit?

Doctrinam veterum de summo bono quare reprehendit Verulamius?

The part *de Exemplari* was sufficiently cultivated both as to simple and comparative good?

Nec Plato nec Dionysius tyrannus sapientes erant, quare attamen huic mori optimum, at illi vivere?

Unde derivat finem Verulamius huic notioni Stoicorum mire congruentem? Quodammodo exhinc culpandus est Verulamius, quare?

Quænam est generalis objectio Verulamii huic doctrinæ Ethnicorum de fine?

Quomodo proponit Baconus novis viribus doctrinam de exemplari dotare?

Optimum criterion habitûs perfecte acquisiti?

A modern moralist remarks the danger of setting out from moral maxims, and exemplifies it from an ancient ethical writer?

Quare Verulamius dividit bonum passivum in conservativum et perfectivum?

Unam doctrinam ethicæ inprimis docet Christiana fides?

How does Bacon illustrate the position, that the good of the community is more important than that of the individual? A similar position is maintained by Cumberland; how?

Occurrit in Verulamio vestigium argumenti ex analogiâ positivi pro Christianismo?

Bacon and Smith equally reprehend the contemplation of nature proposed by the Stoics?

The superiority of the good of community decides several important ethical controversies?

Quonam principio redarguitur philosophia Epicteti?

Alterum abusum ejusdem temporis hoc idem principium evertit?

Animus quis est vere sanus et validus?

In what did the school of Pyrrho and Herillus place happiness? This opinion has been revived in more modern times?

Controversia inter Socratem et sophistam?

Sophistæ videtur suffragari superioritas boni perfectivi?

Verulamius culpat lectiones philosophorum de morte?

Philosophi annisi sunt animum nimis uniformem reddere; quare?

Severitati animi quomodo consulendum?

How does Bacon otherwise designate the "bonum communio- nis"? And why?

Why not a part of political science? How does he illustrate the difference? *Distinctio Verulamii inter officium et virtutem?*

How far does he admit the offices to have been duly treated of?

How does Bacon corroborate his statement as to the importance of the doctrine "*de culturâ animi*"?

Cicero's commendation of the younger Cato is in reference to this?

Proper relation between religion and moral philosophy?

In the culture of the mind three things to be considered?

To what three parts of the art of medicine do they correspond?

How far are they in our power? Yet although the two former are not in our power, we must no less diligently inquire into them? Illustrate this?

Verulamius culpat Aristotelem de affectibus? Culpat quoque Stoicos? Dupliciter errat de affectibus Aristoteles?

Sanctio a pœnis et præmiis est secundum Verulamium tantum exemplum generalis principii, valde utilis in culturâ animi?

Præcipui doctores scientiæ de affectibus? Opinio Aristotelis actiones naturales consuetudine non mutari, a Verulamio limitatur?

Necessitatis regularum unde patet? Regulæ de culturâ animi a Verulamio traditæ?

Juvenes, secundum Aristotelem, non sunt idonei auditores ethicæ?

Nec politicæ, secundum Verulamium; quamdiu?

What is the best ethical compendium for the formation of the mind to virtue?

What does he call this operation as compared with others?

How does Aristotle describe the same state?

Whence only is this high ethical character to be attained? And how?

How does Bacon illustrate the "bona animi" by a comparison with the "bona corporis"?

On this point how does he censure the Stoics?

To what does Smith ascribe this stoical moroseness?

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### QUESTIONS ON THE PREFACE TO THE NOVUM ORGANUM.

Quosnam excessus philosophorum notat Verulamius et ob quam causam? Quisnam honestior?

Whence does Locke derive Scepticism? Whence does Brown derive Dogmatism and Scepticism?

How does Bacon account for Dogmatism?

How did the Dogmatists injure Philosophy?

Bacon mentions three causes for the assertion of scepticism among the ancients?

What does he mean by "quadam doctrinæ copia?" Shew this from a parallel passage in the fifth book?

Two objections urged by Bacon against the opinions held by the ancient Sceptics?

Error of the more ancient Greek philosophers?

What was the aid to the intellect used by the ancients, and why insufficient?

How does Bacon illustrate the inutility of the intellectual efforts of the ancients?

Methodus Verulamii fere exæquat ingenia, subtilitatem animi tamen non excludit; verus locus subtilitatis?

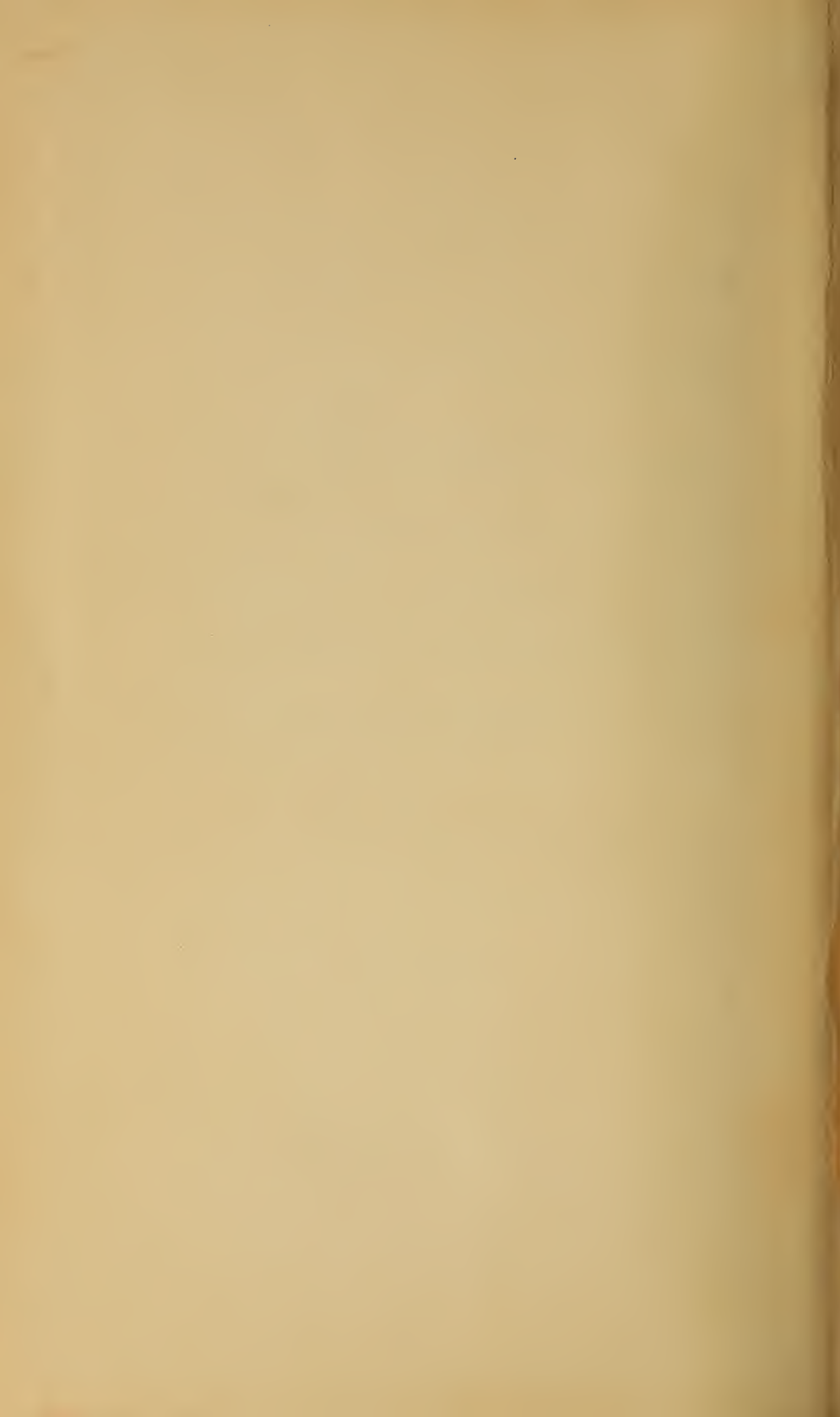
By what names does Bacon designate the ancient philosophy and his own, and why is his totally unfit for the uses he assigns to the other?

In what respects principally do they differ?

Quænam demum est vera philosophia?

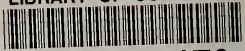
THE END.







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